

2007-04-12 Sequence Listing-JAMES68.016APC.txt
SEQUENCE LISTING

<110> Bryan, Gregory Thomas
Johnson, Richard
Scott, Barry
Young, Carolyn A.
Tapper, Brian Anthony
Parker, Emily Jane

<120> INDOLE-DITERPENE BIOSYNTHESIS

<130> JAMES68.016APC

<140> US 10/584,429
<141> 2006-06-22

<150> PCT/NZ2004/000333
<151> 2004-12-22

<150> NZ 530331
<151> 2003-12-22

<160> 55

<170> PatentIn version 3.3

<210> 1
<211> 1110
<212> DNA
<213> Neotyphodium lolii

<400> 1	
atgacgatgg ctgccaatga cttccattt caatgccagg agaagaaaatc atattctcag	60
ccaaagtctag tctactgcaa tggtaacatt gcggagacgt atctcgaaga aaaaatgtttt	120
atactgtcc ttataatct cgaatgccac tttaaaattta gacaggaaaaa gacagcgccg	180
ttggattatt tgcgtgcctt accttagcaaa gatattcgca gtggactgac cgacgcattt	240
aatgagttcc tgcgtgtccc agaggaaaatc gttctgtca taaaatcgat aattgtatcc	300
cttcacaatg catccttact gtaagttcgaa gattgcataa catagaccta gtatgttca	360
actaacatcg ttatccatcg gatccatcca aactgcacg tggactccctt	420
gtatccacc acatattttgg aatgcacaa acaataatcgccatctt agcgtatcc	480
attgtccatcg gagagcttgcgaa gatccatcg aatccatcgat cattgtatataatcgat	540
gagctaatca atctgcatcg tggcagggtt atggagctcc atggagaga atcgctccat	600
tgccttaccc aagatgatcgatc tctgcgaatcgat atccaaaatcgatccgg tctgttccga	660
ttggcaatca gactgctgcgaa gatccatcgatccgg tctgttccga	720
gatctctcg gatccatcgatccgg tctgttccga	780
tattctatcgatca acaaaatcgatccgg tctgttccga	840
atccatcgatca ttcggatcgatccgg tctgttccga	900
agtgaagatcgatccgg tctgttccga	960

2007-04-12 Sequence Listing-JAMES68.016APC.txt

gcattctgtc	aaaataaaat	tcaatcttgc	gtggaggcaag	caagagagca	atggcggt	1020										
ctagaaaata	gcagttcatg	tggaggcccc	gttcgcaca	tccttgacaa	gttagacaata	1080										
aaaccacggg	caaatataga	agtagagtag				1110										
<210> 2																
<211> 334																
<212> PRT																
<213> Neotyphodium lolii																
<400> 2																
Met	Thr	Met	Ala	Ala	Asn	Asp	Phe	Pro	Phe	Gln	Cys	Gln	Glu	Lys	Lys	15
1																
Ser	Tyr	Ser	Gln	Pro	Ser	Leu	Val	Tyr	Cys	Asn	Gly	Asn	Ile	Ala	Glu	30
			20					25								
Thr	Tyr	Leu	Glu	Glu	Lys	Val	Leu	Thr	Ala	Pro	Leu	Asp	Tyr	Leu	Arg	45
		35					40									
Ala	Leu	Pro	Ser	Lys	Asp	Ile	Arg	Ser	Gly	Leu	Thr	Asp	Ala	Ile	Asn	60
		50			55					60						
Glu	Phe	Leu	Arg	Val	Pro	Glu	Glu	Lys	Val	Leu	Val	Ile	Lys	Arg	Ile	80
		65			70					75						
Ile	Asp	Leu	Leu	His	Asn	Ala	Ser	Leu	Leu	Ile	Asp	Asp	Ile	Gln	Asp	95
		85			90											
Ser	Ser	Lys	Leu	Arg	Arg	Gly	Val	Pro	Val	Ala	His	His	Ile	Phe	Gly	110
		100			105											
Ile	Ala	Gln	Thr	Ile	Asn	Ser	Ala	Asn	Leu	Ala	Tyr	Phe	Ile	Ala	Gln	125
		115			120											
Arg	Glu	Leu	Glu	Lys	Leu	Thr	Asn	Pro	Arg	Ala	Phe	Ala	Ile	Tyr	Asn	140
		130			135											
Glu	Glu	Leu	Ile	Asn	Leu	His	Arg	Gly	Gln	Gly	Met	Glu	Leu	His	Trp	160
		145			150					155						
Arg	Glu	Ser	Leu	His	Cys	Pro	Thr	Glu	Asp	Glu	Tyr	Leu	Arg	Met	Ile	175
		165			170											
Gln	Lys	Lys	Thr	Gly	Gly	Leu	Phe	Arg	Leu	Ala	Ile	Arg	Leu	Leu	Gln	190
		180			185											

2007-04-12 Sequence Listing-JAMES68.016AFC.D
Gly Glu Ser Ala Ser Asp Asp Asp Tyr Val Ser Leu Ile Asp Thr Leu
195 200 205

Gly Thr Leu Phe Gln Ile Arg Asp Asp Tyr Gln Asn Leu Gln Ser Asp
210 215 220

Ile Tyr Ser Lys Asn Lys Gly Tyr Cys Glu Asp Leu Thr Glu Gly Lys
225 230 235 240

Phe Ser Tyr Pro Val Ile His Ser Ile Arg Ser Arg Pro Gly Asp Val
245 250 255

Arg Leu Ile Asn Ile Leu Lys Gln Arg Ser Glu Asp Val Met Val Lys
260 265 270

Gln Tyr Ala Val Gln His Ile Glu Ser Thr Gly Ser Phe Ala Phe Cys
275 280 285

Gln Asn Lys Ile Gln Ser Leu Val Glu Gln Ala Arg Glu Gln Leu Ala
290 295 300

Ala Leu Glu Asn Ser Ser Ser Cys Gly Gly Pro Val Arg Asp Ile Leu
305 310 315 320

Asp Lys Leu Ala Ile Lys Pro Arg Ala Asn Ile Glu Val Glu
325 330

<210> 3
<211> 1647
<212> DNA
<213> *Neotyphodium lolii*

```
<400> 3
atgacttagcg acttcaagg aataatcgta ggaggatcg tggctggct ttcactagcc 60
cactgcttag aaaaaatcg tggttcttc atggttctag agaagggtaa tcaaataatgc 120
ccccaactcg gtgcctcaat tggcattttc ccaaatacggtg gacgtatct tgcataactg 180
ggcatcttcc atagcatcgaa ggtatcgaa tggacatcttag aatctgtatc gatgagatac 240
ccggatggtt tctctttcaa aagtcaatata ccccaagctt tgcatactag gtaataacag 300
tggaaagaaga gtggcctata agtggcatac tatacgtaac ttcgtcggtg taatagttt 360
ggttatcccg tggctttcct tgagaggcaa aggtttcttc agatacttta tgataaaactc 420
aagagcaaaag actgcgtttt tacaacaag cgggttagtca gtattgcaag tggccaagac 480
aaagtccacag caaagacttc agatggcgct aagtacttag cagatatcgat gatcgggtgct 540
gacgggggtcc acagcatcgat caggtcagag atttggaggc atttgaagga aactctcaa 600
atatacgat tagaggcacc qaacqcaaqgt aggttaacct aggattaattt qcaaaqaac 660
```

2007-04-12 Sequence Listing-JAMES68.016APC.txt

tttactaatg	agggagccac	tttagtatta	agcatgatta	ttcatgcatt	tacggaattt	720
ctttaaacgt	tccccagtc	atccttagaa	tacagttaaa	ctgttttagat	gacggagtgt	780
caatacactt	gtttacgggt	aaacaatcca	aattatttt	gtttgttac	atcaaaacgc	840
ctcaggctag	cttgctaaa	gtagagattt	acaatacaca	tacagcaagg	tgtatctgcg	900
aaggactgag	gacgaaaaag	gtttcagata	ccttatgttt	tgaagatgt	tggtcaagat	960
gcaccatatt	caagatgacg	cctcttgagg	aagggtgtt	taagcattgg	aactatggcc	1020
gcttagcatg	tatttgtat	gctatccgca	aggtatgtgg	atgtatgtat	atgtccctat	1080
ttcgtgtcat	cagtggatg	acaaaagaag	gccactat	gccctaata	taaatgtatcg	1140
tatcgctaac	attaacagat	ggccccaat	aatgggcaag	gagcaaataat	ggcgatagag	1200
gacgcttgca	gtctcgcaaa	cattctccag	aaaaagatat	cacatgttc	gattcgagac	1260
caagatatac	attcaatgtt	tcaggaattt	tctatggctc	aacgggctcg	cacggagagc	1320
gtctgcgcgc	agtccggat	tctagtcgc	atgcatgcg	atcaaggat	tgagaagaaga	1380
cttcttgggc	ggtacattat	tccttcctg	tatgacgcac	ctgctggttt	atctggattt	1440
tctataagt	gaccaacaag	aatagagt	ttc atagacttgc	ccactagatc	tcttagggga	1500
gcgtggggaa	agtcatggag	agggtcatgg	gaattcatcc	tacaaagctt	ggtctatttt	1560
cgaccacaa	gtttagatgt	ttatgcctt	tatctcgat	cagctgcagc	ttttatcttg	1620
tattgtctta	gcagtctctt	cccgtag				1647

<210> 4

<211> 472

<212> PRT

<213> Neotyphodium lolii

<400> 4

Met	Thr	Ser	Asp	Phe	Lys	Val	Ile	Ile	Val	Gly	Gly	Ser	Val	Ala	Gly
1					5				10				15		

Leu	Ser	Leu	Ala	His	Cys	Leu	Glu	Lys	Ile	Gly	Val	Ser	Phe	Met	Val
						20		25				30			

Leu	Glu	Lys	Gly	Asn	Gln	Ile	Ala	Pro	Gln	Leu	Gly	Ala	Ser	Ile	Gly
						35		40			45				

Ile	Leu	Pro	Asn	Gly	Gly	Arg	Ile	Leu	Asp	Gln	Leu	Gly	Ile	Phe	His
					55				60						

Ser	Ile	Glu	Asp	Glu	Ile	Glu	Pro	Leu	Glu	Ser	Ala	Met	Met	Arg	Tyr
						70			75			80			

Pro Asp Gly Phe Ser Phe Lys Ser Gln Tyr Pro Gln Ala Leu His Thr
 85 90 95

Ser Phe Gly Tyr Pro Val Ala Phe Leu Glu Arg Gln Arg Phe Leu Gln
 100 105 110

Ile Leu Tyr Asp Lys Leu Lys Ser Lys Asp Cys Val Phe Thr Asn Lys
 115 120 125

Arg Val Val Ser Ile Ala Ser Gly Gln Asp Lys Val Thr Ala Lys Thr
 130 135 140

Ser Asp Gly Ala Lys Tyr Leu Ala Asp Ile Val Ile Gly Ala Asp Gly
 145 150 155 160

Val His Ser Ile Val Arg Ser Glu Ile Trp Arg His Leu Lys Glu Asn
 165 170 175

Ser Gln Ile Ser Val Leu Glu Ala Pro Asn Ala Ser Ile Lys His Asp
 180 185 190

Tyr Ser Cys Ile Tyr Gly Ile Ser Leu Asn Val Pro Gln Ile Ile Leu
 195 200 205

Gly Ile Gln Leu Asn Cys Leu Asp Asp Gly Val Ser Ile His Leu Phe
 210 215 220

Thr Gly Lys Gln Ser Lys Leu Phe Trp Phe Val Ile Ile Lys Thr Pro
 225 230 235 240

Gln Ala Ser Phe Ala Lys Val Glu Ile Asp Asn Thr His Thr Ala Arg
 245 250 255

Cys Ile Cys Glu Gly Leu Arg Thr Lys Lys Val Ser Asp Thr Leu Cys
 260 265 270

Phe Glu Asp Val Trp Ser Arg Cys Thr Ile Phe Lys Met Thr Pro Leu
 275 280 285

Glu Glu Gly Val Phe Lys His Trp Asn Tyr Gly Arg Leu Ala Cys Ile
 290 295 300

Gly Asp Ala Ile Arg Lys Met Ala Pro Asn Asn Gly Gln Gly Ala Asn
 305 310 315 320

Met Ala Ile Glu Asp Ala Cys Ser Leu Ala Asn Ile Leu Gln Lys Lys
 325 330 335

2007-04-12 Sequence Listing-JAMES68.016APC.txt

Ile Ser His Gly Ser Ile Arg Asp Gln Asp Ile Asn Ser Met Phe Gln
 340 345 350

Glu Phe Ser Met Ala Gln Arg Ala Arg Thr Glu Ser Val Cys Ala Gln
 355 360 365

Ser Glu Phe Leu Val Arg Met His Ala Asn Gln Gly Ile Gly Arg Arg
 370 375 380

Leu Leu Gly Arg Tyr Leu Ile Pro Phe Leu Tyr Asp Ala Pro Ala Gly
 385 390 395 400

Leu Ser Gly Phe Ser Ile Ser Gly Ala Thr Arg Ile Glu Phe Ile Asp
 405 410 415

Leu Pro Thr Arg Ser Leu Arg Gly Ala Trp Gly Lys Ser Trp Arg Gly
 420 425 430

Ser Trp Glu Phe Ile Leu Gln Ser Leu Val Tyr Leu Arg Pro Lys Phe
 435 440 445

Arg Ile Val Tyr Ala Leu Tyr Leu Val Ala Ala Ala Phe Ile Leu
 450 455 460

Tyr Cys Leu Ser Ser Leu Phe Pro
 465 470

<210> 5
 <211> 2063
 <212> DNA
 <213> Neotyphodium lolii

<400> 5		
atgcaatacg gtaatttaac aactgttatta ctctcgctta atactttatt gtccttgaat	60	
tcttcgtcaa tctgcctatgt tcactggctg caagtgttgg tggctctgtct tgctttgatc	120	
gtctcgatct ttcttatattt gcgacacccc actggcatca atgctctttt cgaggatat	180	
cgttccatctt gggagccgcc gctcttgggtt cagatgcgtt acgtcttcaa cgctgcctca	240	
atgatacgcg aaggatatgc taaggatgtt ttatccgc gttagaggctct tctacccgga	300	
tagaccgaga agataacaac ttccggaaacag tggaaagact ccttgccttca gatctcagca	360	
tacgacgggtt acattcttat tgcgccttca agatattttgg atgaccccttca caacaagtca	420	
caaggaggat taagtgcata ttatggttt atccgggttga ggaatggccac caaccaaaaa	480	
acgcagagcc tattagcaca tggctcaca tattcgaatt tgcgttgcattt tgggtggtag	540	
ctatagcgcc atcaccctgc ttggagaaaa cgtatgttgcgc attcgtgcgc ttcaggtatg	600	

2007-04-12 Sequence Listing-JAMES68.016APC.txt

tacacccttc	caaaagtctg	ttagggacct	tccttactct	actacagaca	aaaatcaccc	660
caaataatgc	gaaattatgc	gatgacataa	gggatgagtt	tcagttatgt	ctgatagacag	720
acttcccgac	ctgcagaggt	atgccattc	caaataatccca	ttatgcagtc	tctacttttt	780
ctggcactaa	cgtatctaa	catagattgg	acatcagtgt	ccgtgcattcc	attgtttctaa	840
aaagcagtcg	aaaggataac	acatcggtt	tttgggttggat	tgccattatg	tcggaatccca	900
caatgggtcc	aagcgaccag	caagcatca	cattacggta	cgtcaattga	ctaataatag	960
gcaataatcg	cgtcataatcg	cttgcagca	acaatgatac	agatagctat	gagatctgtc	1020
ccaaagtctca	ttcagccctt	actaaatttt	tgccctccgt	ggccatggaa	gaacgcagcc	1080
tgtgttcgtg	aagcaaagaa	tgcccttata	ttgaaatgc	aacgccgacg	aaatctcgag	1140
aaatgttaaca	gtttgttata	tatcaaattcc	aatgacttgc	tgcagcgtt	tatggaaatgt	1200
tcttcctta	gtcatgagga	tagccagctt	gatgttgcg	cccgataat	gctcacatgt	1260
aacacaatcg	ctggccacag	tactgcccga	tccggagcac	atgcactgtt	cgatatggtt	1320
agccactcta	agtatattga	attgtcgtgt	gaggaggctc	ttaaagtctt	tcgacatgtt	1380
gaactgcgtg	ttacaaaaca	ggctttgggg	gatttgcgaa	aattggacag	cttcctcaga	1440
gagtttagtat	tgtccaaac	atcacaatct	caccacattc	tcacgcttgc	ttttccctccg	1500
tactaatgtat	ggtcgttgc	aagatccaa	cgacataatc	cgttaagctt	gtgtatgttt	1560
agctaagagt	ctcggaaaacc	tgaaatgtt	tgtccgtgc	ccgagttctt	acgtcttta	1620
ctacagtagg	ctttttcgg	gtcgttattag	accctgcccgg	tatcacactt	caagatggca	1680
cacatgttcc	ttacaacaca	ctgctttgt	tcgcaccaca	tgcgatatcc	aatgaccgg	1740
atgtatgataga	agacccaacc	tcgttcaacg	gttgcgata	ctacgaacag	cgtgtcgtg	1800
acgccagtc	agagaaaaag	catcaatacg	ctactacgg	taaatctcac	ctgcatttttgc	1860
gctacggaaac	ctggggcctgt	ccaggcccgt	tcttggccctc	tgtatgtta	aaagtgttca	1920
taacgatgct	tctgcttcag	tatgacatcc	gctccccgaa	gagagcaaaa	cggcctgtgg	1980
caggtcattt	tcatgagttt	ccgcctttca	atattaacac	accactgtt	atgaaacgac	2040
gcaatgatcc	gctagttctat	tga				2063

<210> 6

<211> 533

<212> PRT

<213> Neotyphodium lolii

<400> 6

Met Gln Tyr Gly Asn Leu Thr Thr Val Leu Leu Leu Arg Asn Thr Leu
 1 5 10 15

Leu Ser Leu Asn Ser Ser Ser Ile Cys His Val His Trp Leu Gln Val

Ile Val Ala Leu Leu Val Leu Ile Val Cys Ile Phe Leu Tyr Trp Arg
35 40 45

Thr Pro Thr Gly Ile Asn Ala Pro Phe Ala Gly Tyr Arg Ser Pro Trp
50 55 60

Glu Pro Pro Leu Leu Val Gln Met Arg Tyr Val Phe Asn Ala Ala Ser
65 70 75 80

Met Ile Arg Glu Gly Tyr Ala Lys Trp Lys Asp Ser Leu Phe Gln Ile
85 90 95

Ser Arg Tyr Asp Gly Asp Ile Leu Ile Val Pro Pro Arg Tyr Leu Asp
100 105 110

Asp Leu His Asn Lys Ser Gln Glu Glu Leu Ser Ala Ile Tyr Gly Leu
115 120 125

Ile Arg Asn Phe Gly Gly Ser Tyr Ser Gly Ile Thr Leu Leu Gly Glu
130 135 140

Asn Asp Val Gly Ile Arg Ala Leu Gln Thr Lys Ile Thr Pro Asn Leu
145 150 155 160

Ala Lys Leu Cys Asp Asp Ile Arg Asp Glu Phe Gln Tyr Cys Leu Asp
165 170 175

Thr Asp Phe Pro Ala Cys Arg Asp Trp Thr Ser Val Ser Val His Pro
180 185 190

Leu Phe Leu Lys Ala Val Glu Arg Ile Thr His Arg Ile Phe Val Gly
195 200 205

Leu Pro Leu Cys Arg Asn Pro Gln Trp Val Gln Ala Thr Ser Lys His
210 215 220

Ala His Tyr Ala Thr Met Ile Gln Ile Ala Met Arg Ser Val Pro Lys
225 230 235 240

Phe Ile Gln Pro Leu Leu Asn Phe Cys Leu Pro Trp Pro Trp Lys Asn
245 250 255

Ala Ala Cys Val Arg Glu Ala Lys Asn Ala Leu Ile Leu Glu Met Gln
260 265 270

Arg Arg Arg Asn Leu Glu Lys Val Asn Ser Phe Asp Tyr Ile Lys Ser
 275 280 285

Asn Asp Leu Leu Gln Ala Val Met Glu Met Ser Ser Pro Ser His Glu
 290 295 300

Asp Ser Gln Leu Asp Val Val Ala Gln Ile Met Leu Thr Met Asn Thr
 305 310 315 320

Ile Ala Gly His Ser Thr Ala Ala Ser Gly Ala His Ala Leu Phe Asp
 325 330 335

Met Val Ser His Ser Lys Tyr Ile Glu Leu Leu Arg Glu Glu Ala Leu
 340 345 350

Gln Val Phe Arg His Val Glu Leu Arg Val Thr Lys Gln Ala Leu Gly
 355 360 365

Asp Leu Arg Lys Leu Asp Ser Phe Leu Arg Glu Ser Gln Arg His Asn
 370 375 380

Pro Leu Ser Leu Leu Gly Phe Phe Arg Val Val Leu Asp Pro Ala Gly
 385 390 395 400

Ile Thr Leu Gln Asp Gly Thr His Val Pro Tyr Asn Thr Leu Leu Cys
 405 410 415

Val Ala Pro His Ala Ile Ser Asn Asp Pro Asp Val Ile Glu Asp Pro
 420 425 430

Thr Ser Phe Asn Gly Leu Arg Tyr Tyr Glu Gln Arg Cys Arg Asp Ala
 435 440 445

Ser Gln Glu Lys Lys His Gln Tyr Ala Thr Thr Asp Lys Ser His Leu
 450 455 460

His Phe Gly Tyr Gly Thr Trp Ala Cys Pro Gly Arg Phe Leu Ala Ser
 465 470 475 480

Asp Met Leu Lys Val Ile Leu Thr Met Leu Leu Leu Gln Tyr Asp Ile
 485 490 495

Arg Ser Pro Glu Arg Ala Lys Arg Pro Val Ala Gly His Phe His Glu
 500 505 510

Phe Pro Leu Phe Asn Ile Asn Thr Pro Leu Leu Met Lys Arg Arg Asn
 515 520 525

Asp Ser Leu Val Leu
530

<210> 7
<211> 1115
<212> DNA
<213> *Neotyphodium lolii*

<400> 7
atgacatctg gagcatggct cgtggctcgc cctgcggcca tcgaaattgc ggcctcttg 60
tttgcattta cgctcggta tcttagaaag tacacaatca attacaatc tgcgtttct 120
caagccatg atcattatgg ctatggctat gaacgtaccc ctcacgagg tattggcggc 180
agcaatggca agattctga ctgtccatac tcttatgtga ttagtctcta tgggcataat 240
catttctctc ccctcgtgga ttttcttcat ccaacattga aacataaaata tcccaagaaa 300
cattcttga tcctggatat catggatgcg gtccatctt gtctaatttat gtttgacgat 360
atttgcgacc acagccctaa gcggaaaaat cacactacgg ctcactgtt atacggatca 420
tgcgaaactg ccaatcgagc atatctcgat ctcacaaagg tcattaatag agcaatgaaa 480
gaacaacctg tccttggaaat tgaacttctg agagcactag aactgtatact cgagggacaa 540
gacatgtctt tggtttggcg aagagacggt ttgcgtatctt tgcgatctt tggtaagaa 600
agcctgttga cgtacaaaaa tatggctctg ctgaagacag gcacactttt tgcgtctt 660
ggggaggcttt tgaaccaagg aggtcatcaa tcagacgatc tgtagggccg atttgggtat 720
gtaaaattttt tttttttcg ctcgtttcat aattccgcgg caaggtcgct taactaattc 780
aatggaatgg tagctggatc gcacaattgc aaaatgattt caagaacata tactcagaag 840
agtacgctt taacaaaggc actgttgcag aagacactcg caacagagaa ttgtccttc 900
ctgttgtgt tgctcttaat gacaaacata ctgagccgca gataaggaag gcgtttcaga 960
gccaaatca aggcgcacatt aaacgggcac tccaaagcgat agagtcaccc tgggtttcaga 1020
acacgtgtct caaaacgcgc caggaggcag gtcagggtct agagaacttgc ttggccgtct 1080
qqqqacqaaa aqaaacaaatq cactttacaa aatga 1115

<210> 8
<211> 345
<212> PRT
<213> *Neotyphodium lolii*

<400> 8

Met Thr Ser Gly Ala Trp Leu Val Ala Arg Pro Ala Ala Ile Glu Ile
1 5 10 15

Ala Ala Leu Leu Phe Ala Phe Thr Leu Gly Tyr Leu Val Lys Tyr Thr
20 25 30

Ile Asn Tyr Gln Ser Val Val Ser Gln Ala Ile Asp His Tyr Gly Tyr
 35 40 45

Gly Tyr Glu Arg Thr Ser His Glu Gly Ile Gly Gly Ser Asn Gly Lys
 50 55 60

Ile Pro Asp Cys Pro Tyr Ser Tyr Val Ile Ser Leu Tyr Gly His Asn
 65 70 75 80

His Phe Ser Pro Leu Val Asp Phe Leu His Pro Thr Leu Lys His Lys
 85 90 95

Tyr Pro Lys Lys His Ser Leu Ile Leu Asp Ile Met Asp Ala Val His
 100 105 110

Leu Cys Leu Ile Met Val Asp Asp Ile Cys Asp His Ser Pro Lys Arg
 115 120 125

Lys Asn His Thr Thr Ala His Leu Leu Tyr Gly Ser Cys Glu Thr Ala
 130 135 140

Asn Arg Ala Tyr Phe Val Leu Thr Lys Val Ile Asn Arg Ala Met Lys
 145 150 155 160

Glu Gln Pro Val Leu Gly Ile Glu Leu Leu Arg Ala Leu Glu Leu Ile
 165 170 175

Leu Glu Gly Gln Asp Met Ser Leu Val Trp Arg Arg Asp Gly Leu Arg
 180 185 190

Ser Phe Glu Ser Tyr Gly Glu Glu Ser Leu Leu Thr Tyr Lys Asn Met
 195 200 205

Ala Leu Leu Lys Thr Gly Thr Leu Phe Val Leu Leu Gly Arg Leu Leu
 210 215 220

Asn Gln Gly Gly His Gln Ser Asp Asp Leu Leu Gly Arg Phe Gly Trp
 225 230 235 240

Tyr Ala Gln Leu Gln Asn Asp Cys Lys Asn Ile Tyr Ser Glu Glu Tyr
 245 250 255

Ala Phe Asn Lys Gly Thr Val Ala Glu Asp Leu Arg Asn Arg Glu Leu
 260 265 270

Ser Phe Pro Val Val Val Ala Leu Asn Asp Lys His Thr Glu Pro Gln

Ile Arg Lys Ala Phe Gln Ser Gln Asn Gln Gly Asp Ile Lys Arg Ala
290 295 300Leu Gln Ala Leu Glu Ser Pro Ser Val Lys Asn Thr Cys Leu Lys Thr
305 310 315 320Leu Gln Glu Ala Gly Gln Gly Leu Glu Asn Leu Val Ala Val Trp Gly
325 330 335Arg Lys Glu Gln Met His Phe Thr Lys
340 345

<210> 9

<211> 1829

<212> DNA

<213> Neotyphodium lolii

<400> 9

atgttaatgt	tgcacgctgt	cccaagtgggt	atctgtttac	tactgtggta	cgttgtttac	60
ggtaccaaac	ggaaagaatg	tataccaacc	attcgacgtt	ggcctcgatt	actcccccaa	120
ttccctcgatc	ggctgagttt	taatgaccat	gccgcccccc	tagtcaaaca	tggctatgag	180
aagggtttcg	gttccaaagtc	tgtgagccatc	cgtgtatgata	gtactaaccg	cctaggttac	240
agcacaaaaaa	tcaaccgttt	aggctactta	agatggacat	ggatctgttatt	gtcattccctt	300
tacaatacgc	gctggatta	cgggcgggta	cgagcgacaa	attagccctt	ttaacagccaa	360
gtcttgatga	caatgctgtt	aaatgttacga	ggatattttt	agggggcgaa	cttcacacac	420
gtgcatacata	gcagcgatgg	actccaaagc	ttcgttaatgt	taatctaaca	gaatacgtttt	480
gcactatgct	aactgttatcc	agcacaaact	cttccagtc	tattggatga	gtctcaatcat	540
gcctttgggc	aagtcttacc	tgcggcaac	gacggatgtt	gttttcatc	tttcaaacat	600
tccacttgtc	tagtgggttc	taatattatgt	ggagggttcca	atgcttggat	ttctgtcaat	660
ccatacgaat	tgttctcaa	tctagctacc	cgtgtatcag	cgaggcttatt	cgttggagac	720
ctgatggatgc	gaaacgaaat	ttttctcgag	actactgttt	cttttagtgc	caacacgtttt	780
gatacgatata	ccacccccc	tagtttggc	aatttggta	cacatttattt	cgcacgggttgg	840
atttccacag	cggaaaagaa	tcacggccaa	ttacaataca	ttcaaaacctt	ccttgggttca	900
gaagtccaga	gaaggaaact	taactctgag	gaaaaggcag	acgactttttt	gcagtgggtgt	960
acagagtttag	cagtcaccga	ggatgaagca	cggccagaag	cacttgcgc	tcgtacgtttttt	1020
ggaatattga	gcatggctgt	cattcataca	acagctatgg	cgtaactca	catactttttt	1080
gacatgatct	cggacgacag	cttgaaggag	agccctccgaa	gagaacagca	aaacgtgtttttt	1140

2007-04-12 Sequence Listing-JAMES68.016APC.txt

aagcatgggtt	ggacggaaat	cacgcaacag	actatgcgtt	atatgaaaca	attggatagc	1200
ctgatgagag	agtcaacaacg	aatcaatcca	gtgggcgagt	gtatggacta	ttctaagcca	1260
gtctttgtc	aaacttgaa	ctaactggcg	attgaagtca	cttttagacg	cattgtccga	1320
gaacgaatta	cattgtccga	tggctaccag	ctacagccgg	gacagcagat	tgcgattcca	1380
gcgaaagtgt	tcaatacggaa	cagtagcggaa	ttatccgacg	ctcacttgc	tcaacccattt	1440
cgtatgttga	aacaatctgg	cactgccccaa	acatcatttt	ctaacagcag	cgcccttgaat	1500
ctgcacttcg	gatttggag	atatgcctgt	ccgggacgct	tcatagcttc	cgtatgtat	1560
gtagattttc	atctttttt	tttccatatac	aatctccctt	caagctcatg	tgacgcacat	1620
tcgacccctt	tgactaaccc	ttgagttgt	gctcatagta	tatgattaaa	gcaatcatga	1680
gtcggattct	gctcgagat	gattttaagc	tagatgtga	gttccgtcg	cgccgcctc	1740
ctaacattgt	tcatggggat	aagatccccc	ccaatcgaa	tgccgttgc	ctttgcgc	1800
gcttggagaa	gacagttacc	gtatgttga				1829

<210> 10
<211> 498
<212> PRT
<213> Neotyphodium lolii

<400> 10

Met Leu Met Leu His Ala Val Pro Val Gly Ile Cys Leu Leu Leu Trp
1 5 10 15

Tyr Val Val Tyr Gly Thr Lys Arg Lys Glu Cys Ile Pro Thr Ile Arg
20 25 30

Arg Trp Pro Arg Leu Leu Pro Gln Phe Leu Asp Arg Leu Ser Tyr Asn
35 40 45

Asp His Ala Ala Arg Leu Val Lys His Gly Tyr Glu Lys His Lys Asn
50 55 60

Gln Pro Phe Arg Leu Leu Lys Met Asp Met Asp Leu Ile Val Ile Pro
65 70 75 80

Leu Gln Tyr Ala Leu Glu Leu Arg Ala Val Thr Ser Asp Lys Leu Asp
85 90 95

Pro Leu Thr Ala Ser Phe Asp Asp Asn Ala Gly Lys Val Thr Arg Ile
100 105 110

Leu Leu Gly Ser Glu Leu His Thr Arg Ala Ile Gln Gln Arg Leu Thr
115 120 125

2007-04-12 Sequence Listing-JAMES68.016APC.txt

Pro Lys Leu Pro Gln Thr Leu Pro Val Leu Leu Asp Glu Leu Asn His
130 135 140

Ala Phe Gly Gln Val Leu Pro Ala Gly Asn Asp Gly Ser Asn Ala Trp
145 150 155 160

Ile Ser Val Asn Pro Tyr Glu Leu Val Leu Asn Leu Ala Thr Arg Ala
165 170 175

Thr Ala Arg Leu Phe Val Gly Asp Leu Ile Cys Arg Asn Glu Ile Phe
180 185 190

Leu Glu Thr Thr Ala Ser Phe Ser Arg Asn Thr Phe Asp Thr Ile Ser
195 200 205

Thr Ser Arg Ser Phe Gly Asn Leu Phe Thr His Tyr Phe Ala Arg Trp
210 215 220

Ile Ser Thr Ala Lys Glu Ala His Gly Gln Leu Gln Tyr Ile Gln Asn
225 230 235 240

Leu Leu Gly Ser Glu Val Gln Arg Arg Lys Leu Asn Ser Glu Glu Lys
245 250 255

His Asp Asp Phe Leu Gln Trp Cys Thr Glu Leu Ala Val Thr Glu Asp
260 265 270

Glu Ala Arg Pro Glu Ala Leu Ala His Arg Thr Leu Gly Ile Leu Ser
275 280 285

Met Ala Val Ile His Thr Thr Ala Met Ala Leu Thr His Ile Leu Phe
290 295 300

Asp Met Ile Ser Asp Asp Ser Leu Lys Glu Ser Leu Arg Arg Glu Gln
305 310 315 320

Gln Asn Val Leu Lys His Gly Trp Thr Glu Ile Thr Gln Gln Thr Met
325 330 335

Leu Asp Met Lys Gln Leu Asp Ser Leu Met Arg Glu Ser Gln Arg Ile
340 345 350

Asn Pro Val Gly Glu Phe Thr Phe Arg Arg Ile Val Arg Glu Arg Ile
355 360 365

Thr Leu Ser Asp Gly Tyr Gln Leu Gln Pro Gly Gln Gln Ile Ala Ile
370 375 380

2007-04-12 Sequence Listing-JAMES68.016APC.txt

Pro Ala Lys Cys Ile Asn Thr Asp Ser Thr Lys Leu Ser Asp Ala His
385 390 395 400

Leu Phe Gln Pro Phe Arg Trp Leu Lys Gln Ser Gly Thr Ala Thr Thr
405 410 415

Ser Phe Ser Asn Ser Ser Ala Leu Asn Leu His Phe Gly Phe Gly Arg
420 425 430

Tyr Ala Cys Pro Gly Arg Phe Ile Ala Ser Tyr Met Ile Lys Ala Ile
435 440 445

Met Ser Arg Ile Leu Leu Glu Tyr Asp Phe Lys Leu Asp Ser Glu Phe
450 455 460

Pro Ser Arg Arg Pro Pro Asn Ile Val His Gly Asp Lys Ile Leu Pro
465 470 475 480

Asn Arg Asn Ala Val Val Leu Leu Arg Arg Leu Glu Lys Thr Val Thr
485 490 495

Val Cys

<210> 11
<211> 1945
<212> DNA
<213> *Neotyphodium lolii*

2007-04-12 Sequence Listing-JAMES68.016APC.txt

ctatTTCCA	actaTTTG	aggTCgtCAT	gttggCTgAC	tgggTCgATg	cgttAGACT	780
ggaaACCgAT	tGATGCCCT	gaacttCTT	cgaAGTTGG	gttgcGGATA	tcgcAGCGAA	840
tCTTgATGG	ctggCCCATG	agtCGCgATC	aAGAGCTCT	tGAATCGC	caaggCTACG	900
cAGACgCTGG	taaGAGGAC	agCTGTTACG	tATGACCC	ttCTTCgGTA	aaaACTAACG	960
ggggTTTCAG	ctaccGTCGT	ccAGTTG	cc	ctgAAactac	ttcCTCGCCA	1020
ctTGTCTATC	ctCTGCTCCC	acaAGCATGG	gCTACTAAAT	cgtggATCAG	gcGCTGTGAC	1080
aAGATACTGG	caaAGGAAAT	gcaACGTCGA	caAGTTTG	agaAGTCGA	tcccGTgtAC	1140
gAGAAACCAA	aggACTTGCT	gcAGGGCATG	gtggACCTGG	agCCGTC	gcCTGTTGAC	1200
aaACTTGGAC	atGATTTCT	cgtCCAAGCC	ttGATTTCCA	gaATGGCTCC	agTTGTTACC	1260
atGGCCAAA	ccCTTGTGA	tCTTGCCTC	cACCTGAGG	atATCGAGGA	gCTGCGTGAT	1320
gAGGTTCTGC	aAGTCATAGG	accAGACGGG	gcGGGATTAG	gAAACCTACG	acaATCATT	1380
accAAACCTG	acaAGATGGA	cAGCgtCTTG	aggGAATCTG	ccAGGTTAC	ccCTCTATCT	1440
atGAGTAAGT	gCCATTCTG	tCCCTCCAGAA	tagCTTGTG	gCATGACTAA	tCTGTGGTAT	1500
agTGACAATG	cACCGCCGGG	ttCAGGACGC	caAGGGCATC	acGCTCCATG	acGGTGTGCA	1560
tCTTCCACGA	ggCACG	catG	tggCATTCCC	agCgtTAC	acc	1620
ggTGTCAggT	gCAGATATCT	atGACGGGCT	gCgCTGGTAC	aggAAGGACC	tcGGCgAGGC	1680
ccAAAGAAAC	gAAGCTCCCA	agCAtCGATT	tGTCACCCCC	gACAGCAACT	actTGACCTT	1740
tggTCCGgt	aaataCgtCT	gCCCGGCG	atttatAGCG	gAACACATGT	tGAAGCTGAT	1800
gatGACC	cc	gtgCCTG	gCTACGAGTT	caAGTGGCCT	ccGGGAGTCC	1860
acaACAGTAT	cGCGATG	tCT	ttGCTTATCC	aAGCAAAACC	acACTGTTGA	1920
caaAGATGGC	gatCAGATTC	tttAA				1945

<210> 12

<211> 525

<212> PRT

<213> Neotyphodium lolii

<400> 12

Met	Ala	Phe	Ala	Ser	Leu	Leu	His	His	Ile	Trp	Asn	His	Ala	Val	Asp
1															
														10	15

Cys	Ala	Glu	Gln	Leu	Thr	Trp	Trp	Gln	Thr	Ile	Val	Ser	Phe	Ile	Ile
														20	30

Phe	Cys	Ile	Met	Cys	Ser	Trp	Leu	Pro	Gly	Asn	Gly	Glu	Met	Arg	Ala
														35	45

Pro Phe Val Gly Tyr Arg Trp Pro Phe Glu Pro Thr Phe Trp Val Arg
 50 55 60

Met Arg Phe Ile Phe Gln Ser Leu Gly Met Met Thr Glu Gly Tyr Ser
 65 70 75 80

Lys Phe Lys Asp Ser Met Phe Lys Ile Thr Thr Asn Asp Ala Asp Trp
 85 90 95

Leu Val Leu Ser Gln Arg Tyr Leu Asp Asp Leu Gln Ser Leu Pro Ala
 100 105 110

Glu Arg Leu Ser His Thr Asp Ala Leu Val Thr Met Trp Gly Ser Ser
 115 120 125

His Ser Pro Phe Ala Leu Leu Asn Lys Ser Asp Leu Ser Ser Arg Ala
 130 135 140

Leu Arg Asp Val Val Ala Pro Asn Tyr Ala Lys Asp Leu Asp Ser Leu
 145 150 155 160

Val Asp Glu Leu Arg Tyr Ser Leu Glu His Asp Ile Asp Ile Gln Asp
 165 170 175

Asp Trp Lys Pro Ile Asp Ala Leu Glu Leu Ser Ser Lys Leu Val Leu
 180 185 190

Arg Ile Ser Gln Arg Ile Leu Ile Gly Trp Pro Met Ser Arg Asp Gln
 195 200 205

Glu Leu Leu Glu Cys Ala Gln Gly Tyr Ala Asp Ala Ala Thr Val Val
 210 215 220

Gln Phe Ala Leu Lys Leu Leu Pro Arg Gln Ile Arg Pro Leu Val Tyr
 225 230 235 240

Pro Leu Leu Pro Gln Ala Trp Ala Thr Lys Ser Trp Ile Arg Arg Cys
 245 250 255

Asp Lys Ile Leu Ala Lys Glu Met Gln Arg Arg Gln Val Leu Glu Lys
 260 265 270

Ser Asp Pro Val Tyr Glu Lys Pro Lys Asp Leu Leu Gln Gly Met Val
 275 280 285

Asp Leu Glu Pro Ser Arg Pro Val Asp Lys Leu Gly His Asp Phe Leu
 290 295 300

Val Gln Ala Leu Ile Ser Arg Met Ala Pro Val Val Thr Met Ala Gln
 305 310 315 320

Thr Leu Val Asp Leu Ala Leu His Pro Glu Asp Ile Glu Glu Leu Arg
 325 330 335

Asp Glu Val Leu Gln Val Ile Gly Pro Asp Gly Ala Gly Leu Gly Asn
 340 345 350

Leu Arg Gln Ser Phe Thr Lys Leu Asp Lys Met Asp Ser Val Leu Arg
 355 360 365

Glu Ser Ala Arg Phe Thr Pro Leu Ser Met Met Thr Met His Arg Arg
 370 375 380

Val Gln Asp Ala Lys Gly Ile Thr Leu His Asp Gly Val His Leu Pro
 385 390 395 400

Arg Gly Thr His Val Ala Phe Pro Ala Tyr His Ile Gly Arg Asp Pro
 405 410 415

Lys Leu Val Ser Gly Ala Asp Ile Tyr Asp Gly Leu Arg Trp Tyr Arg
 420 425 430

Lys Asp Leu Gly Glu Ala Gln Glu Asn Glu Ala Pro Lys His Arg Phe
 435 440 445

Val Thr Pro Asp Ser Asn Tyr Leu Thr Phe Gly Ser Gly Lys Tyr Val
 450 455 460

Cys Pro Gly Arg Phe Ile Ala Glu His Met Leu Lys Leu Met Met Thr
 465 470 475 480

Ala Val Leu Leu Arg Tyr Glu Phe Lys Trp Pro Pro Gly Val Pro Val
 485 490 495

Pro Glu Gln Gln Tyr Arg His Val Phe Ala Tyr Pro Ser Lys Thr Thr
 500 505 510

Leu Leu Ile Lys Arg Arg Lys Asp Gly Asp Gln Ile Leu
 515 520 525

<210> 13
 <211> 2014

<212> DNA
 <213> *Neotyphodium lolii*

<400> 13

2007-04-12 Sequence Listing-JAMES68.016APC.txt

atgaagatgt taacagagca ttttgactt cctaaactt aacctggccat cattgttattt	60
tcaggcgcca ccattattgg tataatattc cttcgatata ttaattaccc tacaagggtt	120
tgaatctgtt tcccttgcta tgcactttt tcggatgtctt accaaaattt tcaagggtt	180
atgtacctgt tggggcatt ggatgtcgat atacaaaatg gctagcggtt attataaacg	240
tgcgtcatgc tcgacaatct atcccgagg gctatgcataa gttttgttt aaaaacgat	300
aaaacgcattt cgtaaacaaa gagaactaat actatgttctt agtatggcga ttccgcgtt	360
cagatactt ctatgactcg aatggaggta ttcatgtt atagacagat gacaaggag	420
tatcagaatg ttgacgacta tcattgtcg ttccgagctg tcattgaccgaa gtaaggtaac	480
tagaccatgt taactgttagg aaaagaagaa aagactaaac cggcgatcgagatttcaat	540
tcaaatggctt acctcccgaa cggcacacg aagccggat tatccctaac tcattgtt	600
ctaaggcctt gagctggcag agaacaaggcg cgaataaaacc cagcgatcca ttccgcgtt	660
cttctccgc cgaattcatg cagggtttc aggaagagat ggcacgacta atccaatatc	720
aaaattcgctc agttatgtca aaccgctccg gtgtgtccctt ggtccacgcatgggtt	780
atgctgtgcc ttgtttccctt ttggctctga aggttaattgg ggccttact acatacgct	840
tgttccggca acctttgtgc caagatgcga cattcctaaa catgtgtgtt caatttggcg	900
atgtgattcc caggatgtcg atcatactac gttcatggcc agcattggca agggcgtaag	960
caagtgccta gacataaaacc cgtcagggtt taaactgcata ttacatca tatagtctta	1020
ttgttaaagat ctgtgtgtctt ccaagggttta tggaaagttt ggcacatc ttgtgtgtt	1080
agataaaagag caggagagaa tcccacgaaa cgaacccat ggtgtatgg ctgtctcgca	1140
cacccccccttctt agcattacac attaacgtat atcttaggata ttccggat cacaatggcc	1200
tgggttgcacc gtcattctt cgtcagggtt gacgtatcgac acatggccgatgtatgtt	1260
aacactattt tcgcagctct tcatacgatcg agtcaggatatttttttctt gtatgaaaag	1320
tccagagctt aaagctaaact ggctcatagc ttgggttgca taccatctt gagcttgcctt	1380
cacgtcttgcata atatagcgat ggccttctgg aagagataga tgcattttttt gaaaagcatg	1440
gaaagggcac taaagcgact ctgactcaa ttgttcaagggtt ggtatgtttt atcaaaagaaa	1500
cgcagaggtt taacccttgc gacgtatgtt taaattccctt gtcctccgattt ccatcattgc	1560
gatttgcata acggccaccgtt cagccgcctt tgcacactg gctctcaag actttactttt	1620
ttccaatggc ctaaacatcc caaaggcag tttgtatgtt acggccattt cgcctatctt	1680
tgaggacgat agatattaca aggttccgaa agttttgtat ggtttcggtt tgcttaggt	1740
gcgtatgac cccaaatttgc gtcatttgc cgccttgc tttgtatgtt atgggttgc atgaggtaa	1800
gcattttggg actggacgatc acggccgtcc ttggatgtt atgggttgc atgaggtaa	1860
gttagctgtt attcatatctt taagtaattt cgtttttgtt attgagaattt ttggaccacg	1920

2007-04-12 Sequence Listing-JAMES68.016APC.txt

gccagcaaat cagccatttg gtaaaattct tctacctgat atgagtgcaa aaatctggct 1980
 aagggagaaa agagctaggg agaagaatct gtga 2014

<210> 14
 <211> 537
 <212> PRT
 <213> *Neotyphodium lolii*

<400> 14

Met Lys Met Leu Thr Glu His Phe Asp Phe Pro Lys Leu Asn Phe Ala
 1 5 10 15

Thr Ile Val Ile Ser Gly Ala Thr Ile Ile Gly Ile Ile Phe Leu Arg
 20 25 30

Tyr Leu Asn Tyr Pro Thr Lys Val Asn Val Pro Val Val Gly Ile Gly
 35 40 45

Val Arg Tyr Thr Lys Trp Leu Ala Ala Ile Ile Asn Val Arg His Ala
 50 55 60

Arg Gln Ser Ile Arg Glu Gly Tyr Ala Lys Tyr Gly Asp Phe Ala Phe
 65 70 75 80

Gln Ile Pro Thr Met Thr Arg Met Glu Val Phe Ile Cys Asp Arg Gln
 85 90 95

Met Thr Arg Glu Tyr Gln Asn Val Asp Asp Tyr His Leu Ser Phe Arg
 100 105 110

Ala Val Met Thr Glu Glu Phe Gln Phe Lys Trp Leu Leu Pro Gly Gln
 115 120 125

Ala His Glu Ala Arg Ile Ile Pro Asn Ser Val Ile Ala Lys Ala Leu
 130 135 140

Ser Trp Gln Arg Thr Arg Ala Asn Lys Pro Ser Asp Pro Phe Phe Glu
 145 150 155 160

Ser Phe Ser Ala Glu Phe Met Gln Gly Phe Gln Glu Glu Met Arg Arg
 165 170 175

Leu Ile Gln Tyr Gln Asn Ser Ser Val Met Ser Asn Arg Ser Gly Ala
 180 185 190

Val Leu Asp Pro Ala His Gly Trp His Ala Val Pro Cys Phe Pro Leu
 195 200 205

Ala Leu Lys Val Ile Gly Arg Leu Thr Thr Tyr Val Leu Phe Gly Lys
 210 215 220

Pro Leu Cys Gln Asp Ala Thr Phe Leu Asn Met Cys Cys Gln Phe Gly
 225 230 235 240

Asp Val Ile Pro Arg Asp Ala Ile Ile Leu Arg Ser Trp Pro Ala Leu
 245 250 255

Ala Arg Pro Leu Ile Val Lys Ile Leu Ser Ala Pro Arg Val Met Gly
 260 265 270

Lys Leu Arg Asn Ile Leu Ile Val Glu Ile Lys Ser Arg Arg Glu Ser
 275 280 285

His Glu Thr Asn Pro Met Ser Asp Ile Leu Asp Phe Thr Met Ala Trp
 290 295 300

Val Asp Arg His Pro Asn Ala Ser Phe Asp Asp Gln His Ile Ala Glu
 305 310 315 320

Met Met Ile Asn Thr Ile Phe Ala Ala Leu His Thr Ser Ser Gln Leu
 325 330 335

Val Val His Thr Ile Phe Glu Leu Ala Ser Arg Pro Glu Tyr Ser Asp
 340 345 350

Ala Leu Leu Glu Glu Ile Asp Ala Cys Phe Glu Lys His Gly Lys Gly
 355 360 365

Thr Lys Ala Ala Leu Asp Ser Met Phe Lys Val Asp Ser Phe Ile Lys
 370 375 380

Glu Thr Gln Arg Phe Asn Pro Leu Asp Ala Ser Ala Leu Ala Arg Leu
 385 390 395 400

Ala Leu Lys Asp Phe Thr Phe Ser Asn Gly Leu Asn Ile Pro Lys Gly
 405 410 415

Ser Val Ile Phe Thr Pro Asn Ser Pro Ile Phe Glu Asp Glu Arg Tyr
 420 425 430

Tyr Lys Asp Pro Lys Val Phe Asp Gly Phe Arg Phe Ala Arg Met Arg
 435 440 445

Asn Asp Pro Lys Leu Gly Leu Phe Cys Asp Leu Thr Ala Thr Asn Glu

Gln Ser Met His Phe Gly Thr Gly Arg His Ala Cys Pro Gly Arg Phe
465 470 475 480Met Val Ser Asp Glu Val Lys Leu Ala Val Ile His Ile Leu Ser Asn
485 490 495Phe Asp Phe Cys Ile Glu Asn Phe Gly Pro Arg Pro Ala Asn Gln Pro
500 505 510Phe Gly Lys Phe Leu Leu Pro Asp Met Ser Ala Lys Ile Trp Leu Arg
515 520 525Glu Lys Arg Ala Arg Glu Lys Asn Leu
530 535<210> 15
<211> 1496
<212> DNA
<213> Neotyphodium lolii<400> 15
atgattgcga aaaatattga actcaatggc ttggatccgg caaccaggc attggacatt 60
ctatactgga aaaatactg catcaaacag ctgaatctc tcctatgcgc cacagattca 120
tactgcactg cagacaaggc cgctcaacta cgcatgggt cgtccccaat 180
cttggccctc ggccgtccaa tgccactggg ccacccatc ttacacgaag tggccccca 240
ataatgttaa gtctaaataac aacatcatca aaaaactgcg tcagatattt ctgggagatt 300
ctagggcga ctggcgaag taatgtatcc ctttggcag tccaagttgc taaggatgtta 360
gtggcttctc tgcgtctac tttcccttc tcaacaaat ggacgcAAC tctactgttcc 420
aattttgcag taacccaga ccaagctcgaa caagtattt acatgcctacc cgagtggatt 480
caaggcttcg tacctgaggg aatggagtgc gatttccaa agagaatccc gttcgccatg 540
acatcattcg acctaaatgg ctccaatgtt gctatgaagc tctacgttac tccaagggttta 600
aaggagattt taactggtac tccctcatca gacttggctt gggagttccctt ccggaaatttta 660
acaccagaaa tggaaaccacg agcggcgcac ttgcttgaga ggttggatg gctttgact 720
ttcgccacc ttgcgtccccc cttacgcctaa ggcgtactc cccacacatt aacagggttta 780
ttaccgataa ttccaggcccg tctgttattt agcttggtagg tattgtactgc gttgacgcacg 840
ctcaccttccaaatgtcaagg gtcagctttt acgttccatac catggcgc tcatatccaa 900
ccgttaaaggaa ttatgttact ctgggggtt gcaatctggaa tggaaacaaacc caaaagggtt 960
taggaataact acaaagtattt tggcaccttat tgcttcaggaa gccagagggtt atttctgaca 1020

2007-04-12 Sequence Listing-JAMES68.016APC.txt						
atggattcga	caaggctgtg	aacgactctt	ccatgtttatg	ccaaaagctt	tatttttatgtt	1080
tcgagctacg	cccaggatca	gacttccctc	aggtgaagac	ctatgtgcca	acttggaaact	1140
atcttcgaac	cgacggggaa	actatccaga	actatgaggc	gatcttccga	gcttgtgacc	1200
atccttgggg	tgaagatagg	acgtacggca	aaattttca	agatgcattt	taagttatcc	1260
cttcagatta	gcgcctaaag	gagtttgaga	tactcccaa	tgcaagctat	taggttgtga	1320
aattgcccact	actaatttgg	gctttttata	gcggacctgc	aaccggagat	cgaaaaaaac	1380
ccatttcactg	cgacgcatct	tttctgttta	ccgaagaaac	tggtgtctac	cagacgtgt	1440
atttcagtcc	tccgatttgg	ggggaaacag	aagtccagtc	aaatctcggtt	gcttga	1496

<210> 16
<211> 439
<212> PRT
<213> *Neotyphodium lolii*

<400> 16

Met Ile Ala Lys Asn Ile Glu Leu Asn Gly Leu Asp Pro Ala Thr Arg
1 5 10 15

Ala Leu Asp Ile Leu Tyr Trp Lys Asn His Cys Ile Lys Glu
20 25 30

Ser Leu Leu Cys Ala Thr Asp Ser Tyr Cys Thr Ala Asp Lys Ala Ala
35 40 45

Gln Leu Arg Ile Leu Ser Glu Leu Val Leu Pro Asn Leu Gly Pro Arg
50 55 60

Pro Ser Asn Ala Thr Gly Pro Ser Tyr Leu Thr Arg Ser Gly Ser Pro
65 70 75 80

Ile Met Leu Ser Leu Asn Thr Thr Ser Ser Lys Asn Cys Val Arg Tyr
85 90 95

Cys Trp Glu Ile Leu Gly Ala Thr Gly Ala Ser Asn Asp Asp Pro Leu
100 105 110

Ala Val Gln Val Ala Lys Asp Val Val Ala Ser Leu Ser Ala Thr Phe
115 120 125

Arg Leu Ser Thr Lys Trp Ser Glu Thr Leu Leu Ser Asn Phe Ala Val
130 135 140

Thr Pro Asp Gln Ala Arg Gln Val Ile Asn Met Leu Pro Glu Trp Ile
145 150 155 160

2007-04-12 Sequence Listing-JAMES68.016APC.txt

Gln Gly Phe Val Pro Glu Gly Met Glu Cys Asp Phe Pro Lys Arg Ile
165 170 175

Pro Phe Ala Met Thr Ser Phe Asp Leu Asn Gly Ser Asn Val Ala Met
180 185 190

Lys Leu Tyr Val Asn Pro Arg Val Lys Glu Ile Leu Thr Gly Thr Pro
195 200 205

Ser Ser Asp Leu Val Trp Glu Phe Leu Arg Asn Leu Thr Pro Glu Met
210 215 220

Lys Pro Arg Ala Val Asp Leu Leu Glu Arg Phe Ile Thr Asp Asn Ser
225 230 235 240

Gly Pro Ser Ala Ile Glu Leu Val Gly Ile Asp Cys Val Asp Asp Ala
245 250 255

His Leu Ser Asn Ala Arg Val Lys Leu Tyr Val His Thr Met Ser Ser
260 265 270

Ser Phe Asn Thr Val Lys Asn Tyr Val Thr Leu Gly Gly Ala Ile Trp
275 280 285

Asp Glu Gln Thr Gln Lys Gly Leu Gly Ile Leu Gln Ser Ile Trp His
290 295 300

Leu Leu Leu Gln Glu Pro Glu Gly Ile Ser Asp Asn Gly Phe Asp Lys
305 310 315 320

Pro Val Asn Asp Ser Ser Met Leu Cys Gln Lys Leu Tyr Phe Ser Phe
325 330 335

Glu Leu Arg Pro Gly Thr Asp Phe Pro Gln Val Lys Thr Tyr Val Pro
340 345 350

Thr Trp Asn Tyr Leu Arg Thr Asp Gly Glu Thr Ile Gln Asn Tyr Glu
355 360 365

Ala Ile Phe Arg Ala Cys Asp His Pro Trp Gly Glu Asp Arg Thr Tyr
370 375 380

Gly Lys Ile Phe Gln Asp Ala Phe Gly Pro Ala Thr Glu Ser Arg Lys
385 390 395 400

Lys Pro Ile His Cys Asp Ala Ser Phe Leu Phe Thr Glu Glu Thr Gly
405 410 415

Val Tyr Gln Thr Leu Tyr Phe Ser Pro Pro Ile Glu Gly Glu Thr Glu
420 425 430

Val Gln Ser Asn Leu Val Ala
435

<210> 17
<211> 1110
<212> DNA
<213> *Epichloë festucae*

<400> 17 atgacgatgg ctgccaatga ctttccattt caatgccagg agaagaaaatc atattctcg 60
ccaagtctag tctactgcaa tggtaacattt gcggagacgt atctcgaaaga aaaggatattt 120
atactgctcc ttataatct cgaatgccac ttaaaaattt gacaggttt gacagcgccg 180
ttggattatt tgcgtgcctt acctagcaaa gatattcgca tggtgactgac cgacgcattt 240
aatgagttcc tgcgtgtccc agaggaaaag gttcttgtca taaagcgat aattgtatctt 300
cttcacaatg catccttact gtaagttcgat gattgcataa catagaccta gtagattctt 360
actaacagct ttacgttgc tgatatccag gattcatcta aactcgacg tggtgactctt 420
gtagccacc acatatttgg aatcgaccaa acaataaattt cgccaatctt acgtatccc 480
attgcccaga gagagcttga gaagcttacg aatccctcgag catttgctat atataatgag 540
gagctaatca atctgcattcg tggtcagggt atggagctcc attggagaga atcgcttcat 600
tgccctaccg aagatgagta tctgcgaatg atccaaaaga agacaggcgg tctgttccga 660
ttggcaatca gactgctgcg aggccaaagc gctagcgatg acgattatgt ctcaacttattt 720
gatactctcg gaaccctgtt ccagattcgat gatgactatc aaaacttaca gagtgatata 780
tattctaaga acaaaggcta ctgtgaggat ttaacagagg gcaaattctc gtatccggtc 840
atccatagta ttccgtcgcg accaggagat gttcgattaa tcaatatttt gaaacagctg 900
agtgaagatg ttatgtgtt gcaatacgcg gtgcacacata tcgaatctac aggaagcttc 960
gcattctgtc aaaataaaat tcaatcttgcg ttggagcagaa caagagagca atttggccgtt 1020
ctagaaaata gcaggctatg tggaggcccc gttcgacata tccttgcacaa gtttagacata 1080
aaaccacggg caaatataga agtagatgt 1110

<210> 18
<211> 334
<212> PRT
<213> *Epichloë festucae*

<400> 18

Met Thr Met Ala Ala Asn Asp Phe Pro Phe Glu Cys Glu Glu Lys Lys

Ser Tyr Ser Gln Pro Ser Leu Val Tyr Cys Asn Gly Asn Ile Ala Glu
20 25 30

Thr Tyr Leu Glu Glu Lys Val Leu Thr Ala Pro Leu Asp Tyr Leu Arg
35 40 45

Ala Leu Pro Ser Lys Asp Ile Arg Ser Gly Leu Thr Asp Ala Ile Asn
50 55 60

Glu Phe Leu Arg Val Pro Glu Glu Lys Val Leu Val Ile Lys Arg Ile
65 70 75 80

Ile Asp Leu Leu His Asn Ala Ser Leu Leu Ile Asp Asp Ile Gln Asp
85 90 95

Ser Ser Lys Leu Arg Arg Gly Val Pro Val Ala His His Ile Phe Gly
100 105 110

Ile Ala Gln Thr Ile Asn Ser Ala Asn Leu Ala Tyr Phe Ile Ala Gln
115 120 125

Arg Glu Leu Glu Lys Leu Thr Asn Pro Arg Ala Phe Ala Ile Tyr Asn
130 135 140

Glu Glu Leu Ile Asn Leu His Arg Gly Gln Gly Met Glu Leu His Trp
145 150 155 160

Arg Glu Ser Leu His Cys Pro Thr Glu Asp Glu Tyr Leu Arg Met Ile
165 170 175

Gln Lys Lys Thr Gly Gly Leu Phe Arg Leu Ala Ile Arg Leu Leu Gln
180 185 190

Gly Glu Ser Ala Ser Asp Asp Asp Tyr Val Ser Leu Ile Asp Thr Leu
195 200 205

Gly Thr Leu Phe Gln Ile Arg Asp Asp Tyr Gln Asn Leu Gln Ser Asp
210 215 220

Ile Tyr Ser Lys Asn Lys Gly Tyr Cys Glu Asp Leu Thr Glu Gly Lys
225 230 235 240

Phe Ser Tyr Pro Val Ile His Ser Ile Arg Ser Arg Pro Gly Asp Val
245 250 255

2007-04-12 Sequence Listing-JAMES08.010APC.EXL
Arg Leu Ile Asn Ile Leu Lys Gln Arg Ser Glu Asp Val Met Val Lys
260 265 270

Gln Tyr Ala Val Gln His Ile Glu Ser Thr Gly Ser Phe Ala Phe Cys
275 280 285

Gln Asn Lys Ile Gln Ser Leu Val Glu Gln Ala Arg Glu Gln Leu Ala
290 295 300

Ala Leu Glu Asn Ser Ser Ser Cys Gly Gly Pro Val Arg Asp Ile Leu
305 310 315 320

Asp Lys Leu Ala Ile Lys Pro Arg Ala Asn Ile Glu Val Glu
325 330

<210> 19
<211> 1647
<212> DNA
<213> *Epichloë festucae*

2007-04-12 Sequence Listing-JAMES68.016APC.txt

tatcgctaac	attaacagat	ggcccaa	aat aatggc	aaag gagcaat	at ggcata	agag	1200										
gacgcttgc	gtctcg	aaa catc	cctccag	aaaagat	at caca	tggttt	gattcg	agac	1260								
caagat	atcaat	ttc	tccaggaa	ttc	tctatgg	ctc	aacggg	cgtc	cacggag	1320							
gtctgcgc	gc	agtc	ggagg	tt	tctat	ccgc	atgc	atgc	atcaagg	ttat	tgga	aaaga	1380				
cttcttgg	gc	ggat	tt	tctat	ccgc	atgc	atgc	atgc	atcaagg	ttat	tgg	aaaga	1440				
tctataag	tg	g	gcgc	aaaca	ag	aatag	atgc	atgc	atgc	atgc	tctt	agggg	aa	1500			
gctgtggg	aa	ag	gtcat	ggag	agg	gtcat	gg	gaatt	catcc	tacaa	aaagt	ttt	gttat	tttg	1560		
cgaccca	ag	tt	taggat	gt	ttat	gcct	tg	tatc	cgtt	cag	ctgc	agc	tttt	atctt	g	1620	
tat	tat	c	tctt	aa	qca	atc	tctt	ccc	ctgt	at	tttt	atctt	g	tttt	atctt	g	1647

<210> 20

<211> 472

<212> PRT

<213> *Epichloë festucae*

<400> 20

Met Thr Ser Asp Phe Lys Val Ile Ile Val Gly Gly Ser Val Ala Gly
1 5 10 15

Leu Ser Leu Ala His Cys Leu Glu Lys Ile Gly Val Ser Phe Val Val
20 25 30

Leu Glu Lys Gly Asn Gln Ile Ala Pro Gln Leu Gly Ala Ser Ile Gly
35 40 45

Ile Leu Pro Asn Gly Gly Arg Ile Leu Asp Gln Leu Gly Ile Phe His
50 55 60

Ser Ile Glu Asp Glu Ile Glu Pro Leu Glu Ser Ala Met Met Arg Tyr
65 70 75 80

Pro Asp Gly Phe Ser Phe Lys Ser Gln Tyr Pro Gln Ala Leu His Thr
85 90 95

Ser Phe Gly Tyr Pro Val Ala Phe Leu Glu Arg Gln Arg Phe Leu Gln
100 105 110

Ile Leu Tyr Asp Lys Leu Lys Ser Lys Asp Cys Val Phe Thr Asn Lys
115 120 125

Arg Val Val Ser Ile Ala Ser Gly Gln Asp Lys Val Thr Ala Lys Thr
120 125 130 135 140

Ser Asp Gly Ala Lys Tyr Leu Ala Asp Ile Val Ile Gly Ala Asp Gly
 145 150 155 160

Val His Ser Ile Val Arg Ser Glu Ile Trp Arg His Leu Lys Glu Asn
 165 170 175

Ser Gln Ile Ser Val Leu Glu Ala Pro Asn Ala Ser Ile Lys His Asp
 180 185 190

Tyr Ser Cys Ile Tyr Gly Ile Ser Leu Asn Val Pro Gln Ile Ile Leu
 195 200 205

Gly Ile Gln Leu Asn Cys Leu Asp Asp Gly Val Ser Ile His Leu Phe
 210 215 220

Thr Gly Lys Gln Ser Lys Leu Phe Trp Phe Val Ile Ile Lys Thr Pro
 225 230 235 240

Gln Ala Ser Phe Ala Lys Val Glu Ile Asp Asn Thr His Thr Ala Arg
 245 250 255

Cys Ile Cys Glu Gly Leu Arg Thr Lys Lys Val Ser Asp Thr Leu Cys
 260 265 270

Phe Glu Asp Val Trp Ser Arg Cys Thr Ile Phe Lys Met Thr Pro Leu
 275 280 285

Glu Glu Gly Val Phe Lys His Trp Asn Tyr Gly Arg Leu Ala Cys Ile
 290 295 300

Gly Asp Ala Ile Arg Lys Met Ala Pro Asn Asn Gly Gln Gly Ala Asn
 305 310 315 320

Met Ala Ile Glu Asp Ala Cys Ser Leu Ala Asn Ile Leu Gln Lys Lys
 325 330 335

Ile Ser His Gly Ser Ile Arg Asp Gln Asp Ile Asn Ser Met Phe Gln
 340 345 350

Glu Phe Ser Met Ala Gln Arg Ala Arg Thr Glu Ser Val Cys Ala Gln
 355 360 365

Ser Glu Phe Leu Val Arg Met His Ala Asn Gln Gly Ile Gly Arg Arg
 370 375 380

Leu Leu Gly Arg Tyr Leu Ile Pro Phe Leu Tyr Asp Ala Pro Ala Gly
 385 390 395 400

2007-04-12 Sequence Listing-JAMES68.016APC.txt

Leu Ser Gly Phe Ser Ile Ser Gly Ala Thr Arg Ile Glu Phe Ile Asp
405 410 415

Leu Pro Thr Arg Ser Leu Arg Gly Ala Trp Gly Lys Ser Trp Arg Gly
420 425 430

Ser Trp Glu Phe Ile Leu Gln Ser Leu Val Tyr Leu Arg Pro Lys Phe
435 440 445

Arg Ile Val Tyr Ala Leu Tyr Leu Val Ala Ala Ala Ala Phe Ile Leu
450 455 460

Tyr Cys Leu Ser Ser Leu Phe Pro
465 470

<210> 21
<211> 2063
<212> DNA
<213> *Epichloë festucae*

<400> 21
atgcaatacgt gtaatttaac aactgttatta ctctcgcta atactttatt gtccttgaat 60
tcttcgtcaa tctgccccatgt tcactggctg caagtgttgc tggtctgtct tgccttgc 120
gtctgcatct ttctatattt gcgacacccc actggcatca atgctccccc cgaggat 180
cggttccacat gggagccgccc gctcttgggtt cagatgcgtt acgtcttcaa cgctgcctca 240
atgatacgcg aaggatatgc taaggatgtt tttatccgcg gttagggct tctacccggaa 300
tagaccgaga agataacaac ttccggaaacag ttggaaagact ccttgcgttca gatctcacgaa 360
tacgacgggtg acattcttat tgccttccaa agatattttgg atgaccccttca caacaagtca 420
caaggaggat taagtgcata ttatgggtttt attcgggttgc ggaatgcac caaccaaaaa 480
acgcagagcc tattagcgca tggcttcaca tattcgaaatt tgcgttgcattttt ttgggttgc 540
ctatagcgcc atcaccctgc ttggagaaaa cgtatgttgcgatttgcgc ttccggatgtt 600
tacacccttc caaaatgttgc tttagggaccc tccctactctt actacagaca aaaatcaccc 660
caaatcttgc gaaattatgc gatgacataa gggatggat tcgttattgtt ctatgcac 720
acttccctgc ctgcagatgttgc atgcccatttc caaaatccca ttatgcgttgc tctactttttt 780
ctggcacttgc cgtatgttgc catagatggt acatcgatgttgc ccgtgcattccatcc 840
aaagcgttgc aaggatataac acatcggttgc ttgttggat tggccattatgc tggaaatccc 900
caatgggttgc aaggcaccatcg caagcatgc cattacggta cgtcaatttgc ctaataatag 960
gcaatatacgttgc cgttgcgttgc acaatgttgc acatcgatgttgc agatcgatgttgc 1020
ccaaagttca ttccggatgttgc ttccggatgttgc gggcatggaa gaacgcaccc 1080

2007-04-12 Sequence Listing-JAMES68.016APC.txt

tgtgttcgtg aagcaaagaa	tgcccttata tttagaaatgc	aacgcccacg aaatctcgag	1140
aaatgttaaca	gttttgatta tatcaaatcc	aatgacttgc tgcaaggcagt	1200
tcttcctcta	gtcatgagga tagccagctt	gatgttgcg cccagataat	1260
aacacaatcg	ctggccacag tactggcga	tccggagcac atgcactgtt	1320
agccactcta	agtatattga attgctgcgt	gaggaggctc ttcaagtctt	1380
gaactgcgtg	ttacaaaaca ggctttgggg	gatttgcgaa aattggacag	1440
gagtttagtat	tgtcttaaac attacaatct	caccacattc tcacgctagc	1500
tactaatgt	ggtcgttgc aagatccaa	cgacataatc cgctaagctt	1560
agctaagagt	ctcggaaaacc tgaaaatgtt	tgtcctgtgc ccgagttcta	1620
ctacagtagg	ctttttcgg gtcgtattag	accctggccg ttcacactt	1680
cacatgttcc	ttacaacaca ctgctttgt	tcgcaccaca tgcgatatcc	1740
atgtataga	agacccaacc tcgttcaacg	gtctgcgata ctacgaacag	1800
acgcaggatca	agagaaaaag catcaatacg	ctactacgg taaatctcac	1860
gctacggAAC	ctggggcctgt ccaggccct	tcttggccctc tgatatgtt	1920
taacgatgct	tctgtttcag tatgacatcc	gctcccccga gagagaaaa	1980
caggtcattt	tcatgagttt ccgctttca	atattaacac accactgtt	2040
gcaatgattt	gctagttcta tga	atgaaacgac	2063

<210> 22
 <211> 533
 <212> PRT
 <213> Epichloë festucae

<400> 22

Met Gln Tyr Gly Asn Leu Thr Thr Val Leu Leu Leu Arg Asn Thr Leu
 1 5 10 15

Leu Ser Leu Asn Ser Ser Ser Ile Cys His Val His Trp Leu Gln Val
 20 25 30

Ile Val Ala Leu Leu Val Leu Ile Val Cys Ile Phe Leu Tyr Trp Arg
 35 40 45

Thr Pro Thr Gly Ile Asn Ala Pro Phe Ala Gly Tyr Arg Ser Pro Trp
 50 55 60

Glu Pro Pro Leu Leu Val Gln Met Arg Tyr Val Phe Asn Ala Ala Ser
 65 70 75 80

Met Ile Arg Glu Gly Tyr Ala Lys Trp Lys Asp Ser Leu Phe Gln Ile
 Page 31

Ser Arg Tyr Asp Gly Asp Ile Leu Ile Val Pro Pro Arg Tyr Leu Asp
100 105 110

Asp Leu His Asn Lys Ser Gln Glu Glu Leu Ser Ala Ile Tyr Gly Leu
115 120 125

Ile Arg Asn Phe Gly Gly Ser Tyr Ser Gly Ile Thr Leu Leu Gly Glu
130 135 140

Asn Asp Val Gly Ile Arg Ala Leu Gln Thr Lys Ile Thr Pro Asn Leu
145 150 155 160

Ala Lys Leu Cys Asp Asp Ile Arg Asp Glu Phe Gln Tyr Cys Leu Asp
165 170 175

Thr Asp Phe Pro Ala Cys Arg Asp Trp Thr Ser Val Ser Val His Pro
180 185 190

Leu Phe Leu Lys Ala Val Glu Arg Ile Thr His Arg Ile Phe Val Gly
195 200 205

Leu Pro Leu Cys Arg Asn Pro Gln Trp Val Gln Ala Thr Ser Lys His
210 215 220

Ala His Tyr Ala Thr Met Ile Gln Ile Ala Met Arg Ser Val Pro Lys
225 230 235 240

Phe Ile Gln Pro Leu Leu Asn Phe Cys Leu Pro Trp Pro Trp Lys Asn
245 250 255

Ala Ala Cys Val Arg Glu Ala Lys Asn Ala Leu Ile Leu Glu Met Gln
260 265 270

Arg Arg Arg Asn Leu Glu Lys Val Asn Ser Phe Asp Tyr Ile Lys Ser
275 280 285

Asn Asp Leu Leu Gln Ala Val Met Glu Met Ser Ser Pro Ser His Glu
290 295 300

Asp Ser Gln Leu Asp Val Val Ala Gln Ile Met Leu Thr Met Asn Thr
305 310 315 320

Ile Ala Gly His Ser Thr Ala Ala Ser Gly Ala His Ala Leu Phe Asp
325 330 335

Met Val Ser His Ser Lys Tyr Ile Glu Leu Leu Arg Glu Glu Ala Leu
 340 345 350

Gln Val Phe Arg His Val Glu Leu Arg Val Thr Lys Gln Ala Leu Gly
 355 360 365

Asp Leu Arg Lys Leu Asp Ser Phe Leu Arg Glu Ser Gln Arg His Asn
 370 375 380

Pro Leu Ser Leu Leu Gly Phe Phe Arg Val Val Leu Asp Pro Ala Gly
 385 390 395 400

Ile Thr Leu Gln Asp Gly Thr His Val Pro Tyr Asn Thr Leu Leu Cys
 405 410 415

Val Ala Pro His Ala Ile Ser Asn Asp Pro Asp Val Ile Glu Asp Pro
 420 425 430

Thr Ser Phe Asn Gly Leu Arg Tyr Tyr Glu Gln Arg Cys Arg Asp Ala
 435 440 445

Ser Gln Glu Lys Lys His Gln Tyr Ala Thr Thr Asp Lys Ser His Leu
 450 455 460

His Phe Gly Tyr Gly Thr Trp Ala Cys Pro Gly Arg Phe Leu Ala Ser
 465 470 475 480

Asp Met Leu Lys Val Ile Leu Thr Met Leu Leu Leu Gln Tyr Asp Ile
 485 490 495

Arg Ser Pro Glu Arg Ala Lys Arg Pro Val Ala Gly His Phe His Glu
 500 505 510

Phe Pro Leu Phe Asn Ile Asn Thr Pro Leu Leu Met Lys Arg Arg Asn
 515 520 525

Asp Ser Leu Val Leu
 530

<210> 23

<211> 11400

<212> DNA

<213> Neotyphodium lolii

<400> 23

aatggactag aaagtacatt tggatatacag tgcttatctcc ttaggcttag tctaccttgt

60

gggtcagtgc agggcccaaca ggccccctgc cacaagggtta gtaaccgcgc aagcacgcga

120

aagtgttagcg tagtaaatta tataggaaaa attagcagta tattaattat tagccttatct

180

2007-04-12 Sequence Listing-JAMES68.016APC.txt

atatataagt	aaataaacct	ttaattca	tctatttaat	tggatata	ccctatgtt	aa	240
cgtgacttca	caaggtaac	taagtccaa	agatagagg	taattgcgt	gagatccaca	300	
ggcttgc	ggggacggca	atgtatgc	atatcgaa	atcaatgcta	ggggcattga	360	
atcaatgact	tctgtacta	cgcgata	cacagctaa	ttacatacac	ctagccctgt	420	
acagtattaa	gtttaactctc	cacctgtatc	cacagctaa	ttacatacac	ctagccctgt	480	
ctttagtgc	ttttagaagac	tatgtacta	tagatcacac	cctaaatgtcc	aatgtctccc	540	
aattagccgc	gaagagagaa	cttacgc	ggaagtgata	aggctataac	atccaaacagg	600	
ttacttaaag	acaacaggct	aggaatcaat	tatagttagca	atcaaaacta	gatcctgtat	660	
tctataacaa	gaagttaaat	ccccctaga	ctatctgtct	atcttttagtt	atactttgg	720	
tttgc	tttgc	tttgc	tttgc	tttgc	tttgc	780	
actttccatt	tcaatgc	cag	gagaagaaat	catattctca	gccaagtc	840	
atggtaacat	tgcggagac	gac	tatctcgaa	aaaagggtatt	tatactgctc	900	
tcaatgc	ctt	aaaat	agacagg	ttt	tgacagcg	960	
tacctagcaa	agatattc	gc	agtggact	gac	tttgcgtgc	1020	
cagaggaaaa	ggttcttgc	ataa	agcgta	taattgat	tcttca	1080	
tgtaaatcg	agat	ttcgata	acatagac	tta	actacagc	1140	
atgatatcca	ggattcat	cc	aaactgc	gttggat	tttgcgtgc	1200	
gaatgc	caca	aaataa	atc	tcg	tttgcgtgc	1260	
agaagcttac	gaatc	cctcg	gat	tttgcgtgc	tttgcgtgc	1320	
gttgtcaggg	tatgg	gag	ctc	cattgg	tttgcgtgc	1380	
atctgc	aat	ccaa	ag	tttgcgtgc	tttgcgtgc	1440	
aaggc	gaa	ccaa	agg	tttgcgtgc	tttgcgtgc	1500	
tccagattcg	agat	gactat	caa	aaacttac	agatgtat	1560	
actgtgagga	ttaa	caagag	gg	caaattct	cgat	1620	
gaccaggaga	tgtt	cgat	ta	caatttt	ccgt	1680	
agcaatacgc	gg	tca	atc	tgttgc	atccatgt	1740	
ttcaatctt	gg	tttgcgtgc	at	tttgcgtgc	tttgcgtgc	1800	
gtggaggccc	cg	tttgcgtgc	at	tttgcgtgc	tttgcgtgc	1860	
aagttagagta	gtt	gacat	aga	aaacattgc	tttgcgtgc	1920	
gtttaaaac	tat	gtgtg	gag	at	tttgcgtgc	1980	
acgcagaaaa	gag	ctaa	acat	tttgcgtgc	tttgcgtgc	2040	

2007-04-12 Sequence Listing-JAMES68.016APC.txt

ccttcataga gacatttgcg gctgtgattt tcgtttacgt catgttgttta aacattgttg	2100
tatgttatct ttgcttagga gtacacatcc attttctc actctactct tagagatcgt	2160
caagtgtcac atacatttct gagaacttagg actttgcata gaatatgcata cggttaggtt	2220
tttgcgtaga gagtacgtgt gctgtgagttt accgttgcgttgc ggtttacaat	2280
ggggcaaggc ttaaagctttt ttaaagccac ggttggactt actgtcagggtt cattttttt	2340
tttagtctaa aacactaagt ttttttact agttataata gacttttctt tccttcttcc	2400
cttctctgtata aaaaacccaa ttgaagaatt aatataaagt gtattcttaa tccttagccct	2460
atcccttaat atatatatat atattgtata ctcttagctat ctctatgttag ggcttagttt	2520
agtactgcct ctatgttagt aaaaggaaaa acccttaat aagaagaaaa atccctttat	2580
attttgcgtat gggaaaacaa ccacccggaaa acgacggatt tgacgtatgac actaacaaca	2640
aagctaacga atttgacgtt atttagcaattt gaaccttagat atcgggatctt aggtctgcga	2700
gggttccgat ccacgcctag gattcaagctt agggggtagg gtctttttctt aataatagg	2760
tattttatttta attaaacaat ccaagcctaa ggcaacgaag ggagagtaaa gtttcttattt	2820
aaaggggaggg aatcttagggg ttttatctag cttaggaggtt acatgtactt ggttccgat	2880
tggccgaattt gatctgacaa gccaatagat ctgacgcgtt caagggtctt gggcccgagg	2940
tcttgcgatgggg gaggtctcgatgggg gaggtcacaa tgcttagccat acaatatctt tcaatatat	3000
aatatatttttatttattatattatgtt ttaccctttaga tagcaatttta tgccatttaac cagttactt	3060
gcccgtatgt tgctttttagt tagggaaaacc atacttaggtt gctaatttttctt tagataactt	3120
gataactagt tagttgccta gtttagaacttctt gatctcttccat gtttcttccat	3180
acccgcgttc tttttttagt ctgttatttgcgtt agtctcgatgggg aagtagcaca tccgcgttac	3240
ctgcgtatgggg accagctatgtt agactgacaa aaaacatctt taccataactt cgtatgtt	3300
agttttttttttt ttttgcgttca agtgcgtttagg gaaaatagccc cacgggttcaag aaaaatccac	3360
tttgcgttacc agtcatcttca ttaatcttgcgtt tggttgcgtt atgtcgatgggg gcgatctcggtt	3420
aacacggaaa ctgcgtatgggg accaggttccat ttttgcgttca gtttgcgttccat	3480
cgttgcgttca ttttgcgttca agtgcgtttagg gaaaatagccc cacgggttcaag aaaaatccac	3540
tttgcgttacc ttttgcgttca gtttgcgttca gtttgcgttca gtttgcgttca gtttgcgttca	3600
ctgttacttac ttttgcgttca gtttgcgttca gtttgcgttca gtttgcgttca gtttgcgttca	3660
ctgttacttac ttttgcgttca gtttgcgttca gtttgcgttca gtttgcgttca gtttgcgttca	3720
ctgttacttac ttttgcgttca gtttgcgttca gtttgcgttca gtttgcgttca gtttgcgttca	3780
taatcttgcgttca gtttgcgttca gtttgcgttca gtttgcgttca gtttgcgttca gtttgcgttca	3840
taatcttgcgttca gtttgcgttca gtttgcgttca gtttgcgttca gtttgcgttca gtttgcgttca	3900
acagcgttca gtttgcgttca gtttgcgttca gtttgcgttca gtttgcgttca gtttgcgttca	3960

2007-04-12 Sequence Listing-JAMES68.016APC.txt

tcaatgaact gtaatggca gggaaagtca atgatcgat atcccccgt tgacttccat	4020
attacgcgg ctaaacaaaa gaaacccgtc agagagataa agatccaatc acttcgcgac	4080
ataggaaaa atagaggaaa actgataata acttttaggtc cagttcatg caatattggg	4140
aaaggccaga agcataatcc gtacaatcgt catgatatcg tcaaagcgag actaagctgt	4200
ttctttatag gggctgagaa atcttggcaa taggaaacccg gaagaatgcc gagtgcact	4260
gacgcaaaga attggcttga gcacccgacc ccctctccat ccctaaccgg tgcgtcatt	4320
atcttcggc aatagatatg gcgtttcatt tcactgtaa atacagatta ctccgtattt	4380
atgtataat acaccctatt acatgtataa ttacacgtag ggaggggtg attaggaagc	4440
gtgcggatga tacgtagaac tactatataa ttaactactc cgatagata gctagtattt	4500
gttattgtaa aggttaggggt caatatacgat gattaaagc gtcaattttt gtcaatttga	4560
gggtcagaca gcacctgagt ttgtaccta aaaggatcat agtgcgtat agtaatgact	4620
agtttacgga ggtacttcta atacattgtt tccactcggtt gtcttagaga gagttttatc	4680
ctagtcaatg cgcgtgcct catacatctt aggttttaag ggagctctcc ctgacagttt	4740
ttgcagctac cttagctaca ttcaagggtt ctatcacgc ataagggtgt gcttaataaaa	4800
cacaccctgt tcaataccca agccacaata aagacagttt ttgtctttgt gcagattcg	4860
gaatcctact aaagcttaca gacacatgca ataccactaa taaaatattt atttggagtt	4920
gttttggagg tggatttttag tataggacta taaccactt cctatcttac atcagaataaa	4980
acccaatttt tgggtcttag acaaaacgtt atgctaaagca aaaagtggag agcttgc	5040
agccagagag aagacatggc gcctataacta aattgtatctt tgatatctg atgcgttgc	5100
cactgcgtga gagataaagc aagttaatcg attgtatcc gatcaaact ttgcgttctt	5160
ggaaagcttt attcgcaca catcaatgtt ctggaatgc taacccgaat cgcattttt	5220
tggaaaccatcg actagcgact tcaaggtaat aatcggttggg ggtacgtgg ctgggc	5280
actagccac tgcgttggaaa aatcggttggt ttcttcatgt gtcttagaga agggtaatca	5340
aatagctccc caactcggtt cctcaattgg cattttgcca aatgggtggac gtattcttgc	5400
tcaactgggc atcttccata gcatcgagga tggaaatcgaa cctctagaat ctgtatgtat	5460
gagatacccg gatggtttctt ctttcaaaag tcaatatccc caagcttgc atactaggta	5520
ataacagtga aagaagagtgc gcctataatgtt gttcatatat cgtaacttc gtgcggtaa	5580
tagttttgtt tatcccggtt ctggatgttga gaggcaagg ttcttcttgc tactttatgt	5640
taaactcaag agcaaaagact gcgtttttac aaacaaggcg gtgtcgttgc ttgcgttgc	5700
ccaaagacaaa gtcacagca agacttcaag tggcgctaaag tacttagcgtt atatcgat	5760
cgggtgttgc ggggtccaca gcatcgatgtt gtcagagattt tgaggcatt tgaaggaaaa	5820

2007-04-12 Sequence Listing-JAMES68.016APC.txt

ctctcaaata tcaagtattag aggacccgaa cgcagaatggg ttaacccatgg attaatttgc	5880
aagaaacttt actaatgagg gagccactta ggatataagc atgattatttc atgcatttac	5940
ggaaatttctt taaacgttcc ccagatcatc cttagaataac agttaaactg ttttagatgac	6000
ggagtgtcaa tacacttgggtaaa caatccaaat tattttgggtt tggttatcatc	6060
aaaacgcctc aggctagtt tgctaaagta gagattgaca atacacatac agcaagggt	6120
atctgcgaag gactgaggac gaaaaaggtt tcagatacct tatgtttga agatgtatgg	6180
tcaagatgca ccatattcaa gatgacgcct cttgaggaag ggggtttaa gcattggAAC	6240
tatggccgt tagcatgtat tggtgatgct atccgcagg tatgtggatg atgctatatg	6300
tccctatttc gtgtcatcg tggatgaca aaagaaggcc actatTTGCC gcataatataa	6360
atgatcgatcgat cgttaacatt aacagatggc cccaaataat gggcaaggag caaatatggc	6420
gatagaggac gcttgcagtc tcgcaaacat cctccagaaa aagatatac atggttcgat	6480
tcgagaccaa gataatcaatt caatgtttca ggaatttctt atggctcaac gggctcgac	6540
ggagagcgtc tgccgcgcgt cgaggttctt atgcccgcatt catgcgaaatc aaggttattgg	6600
aagaagactt ctggggcggt accttattcc ttctgttat gacgcacctg ctggtttatac	6660
tggatTTCTt ataagtggcg caacaagaat agatTCATA gacttgccta cttagatctt	6720
tagggagcg tgggaaaagt catggagagg gtcatggaa ttcatcttac aaagcttgg	6780
ctatTTGCGA cccaaatTTTt ggatagtTTTt tgccTTgtat ctgcTTgcag ctgcagTTT	6840
tatTTgtat tgcttttagca gtctttccc gtaccaagga acaactgtcg aaaatggcc	6900
taatctggaa aagctaatgc ggcgtatgaag gcaggcgaaa ctcaaaaaca gacaagcaat	6960
gaccctcata ttgttaaatg ctatTTGTTa cataacttca tgcgtattca ggtgaaacta	7020
tattaaccca ttTCCAact aggagaaaaa tggtttatag aaaagtaagc aaatagctag	7080
taagaatata ataaaaagct agacatgaac ttatTTCC aacagcaaga ccttaggtata	7140
tagtaactaa aaggtattac gaaCTTAACA tatactaata gtatataata gatgtatTTA	7200
tgttagaaata taagtAAAGA aatagcaat aggttaaggaa ttataaaacc taataggcc	7260
tagtagcacc atttagacta aacacaatAT agttagctat agttatgttag tcataactaa	7320
gaattcaatt aagtaaacac ttgttagat agtaataagt tactatagag aatataagagt	7380
ctatATCCTT atccTTgttc atagtgtcta taagCTCTA gagctattct agaatagcaa	7440
aacgattAGC aaaattgccc tcaagtgtaa gaatAGCCTA gtgtaaaaac catagcgtta	7500
agaaaactata agacttagtaa aaaaaggga gacttggatg ctgcaggta ttgcCTCTT	7560
tattacacta gatatacgcc tttaaagtTT agtcttagct agatgtagaaa ttAAAAGTCC	7620
atggaaactc aagttgattt atagtaataat agccTTaata aggggttttt ttAAAGTCC	7680
gtgtacttag tatgtaaata acacatatag ctacactttt caaaggaaat tgcgtttata	7740

2007-04-12 Sequence Listing-JAMES68.016APC.txt

cgtgcatcca	ttgtttctaa	aagcagtgcga	aaggataaca	catcgattt	tttgtggatt	9660
gccattatgt	cggaatcccc	aatgggtcca	agcggaccagc	aagcatgcac	attacggtac	9720
gtcaattgac	taataatagg	caataatacg	gctcatatgc	tttgcagcaa	caatgataca	9780
gatagctatg	agatctgtcc	caaagttcat	tcagccttta	ctaaatttt	gcctccgtg	9840
gccatggaaag	aacgcagcct	gtgttgcgtga	agcaaagaat	gcccttatat	tagaaatgca	9900
acgcccacga	aatctcgaga	aagttaacag	ttttgattat	atcaaatcca	atgacttgct	9960
gcaagcagtt	atggaaatgt	cttctcttag	tcatgaggat	agccagcttg	atgttgtcgc	10020
ccagataatg	ctcacgtga	acacaatcgc	tggccacagt	actgcccgc	ccggagcacca	10080
tgcactgttc	gatatggta	gccactctaa	gtatattgaa	ttgctgcgtg	aggaggctct	10140
tcaagtcttt	cgacatgttg	aactgcgtgt	tacaaaacag	gcttggggg	atttgcgaaa	10200
atggacagc	ttccctcagag	agtttagtatt	gtcctaaaca	tcacaatctc	accacattct	10260
cacgctagct	tttcctccgt	actaatgatg	gtcgttgcta	agatcccaac	gacataatcc	10320
gctaagcttg	tgtatgttta	gctaagagtc	tcgaaaacct	ggaatgttt	gtccgtgccc	10380
cgagttctaa	cgtctttac	taacgttaggc	tttttcggg	tcgttattaga	ccctgcccgt	10440
atcacacttc	aagatggcac	acatgttct	tacaacacac	tgctttgtgt	cgcaccacat	10500
gcgatatcca	atgacccgga	tgtgtatgaa	gacccaacct	cgttcaacgg	tctgcgatac	10560
taacgaacagc	gctgtcgta	cggcagtc	gagaaaaaaagc	atcaatacgc	tactacggat	10620
aaatctcacc	tgcattttg	ctacggaaacc	tgggcctgtc	caggccgc	cttggccctct	10680
gatatgttaa	aagtgattct	aacgtatgctt	ctgttctcgt	atgacatccg	ctccccccgag	10740
agagcaaaac	ggccctgtggc	aggtcatttt	catgagttc	cgtttaaa	tattaacaca	10800
ccactgttaa	tggaaacgacg	caatgattcg	ctgttctat	gatttattgt	gactttcg	10860
agcatattac	atagtgcgaa	acttaatcta	gaaaactaga	gaatgaatat	cttggcact	10920
gtcatgcatg	cacgccttaa	catcatattc	atttatatta	ttactaatgg	cctagatctt	10980
atttacttag	tggaaactagg	ggaacacatc	actttcttgc	tccatgtgt	gttttaatg	11040
ttattcttg	cgtacatttc	catatagcag	cccgtttagt	aaccgttattc	accttgccta	11100
acaatcgttt	tctaataaca	cgttaaggc	aacaagtgcac	aagtgtttag	taatttagtaa	11160
gcagtttagg	ttagggggag	caaggtatgt	taagcgcagg	gctgtcggtt	tattataata	11220
gaaaagaata	tagtattagg	gttaacacta	gaaaatccc	cctagcttata	taagtaagga	11280
aatagattag	ataattatag	tagtaatatt	tatagaatcg	ctctagctag	cttaagtatg	11340
aattaaccat	catcattacc	taatcatttt	ggtacttata	caggcccttc	cgtacagccca	11400

<210> 24
 <211> 11202

<212> DNA
 <213> Neotyphodium lolii

<400> 24		
atttatgtct ttgcagcgc tgcgtataa ttaagagcaa ttatggctcg ttgcagcaaa	60	
caatcgccca attgatacaa tcaaaaattcc acaagcgaaa gttgtacaa ctacgtcct	120	
atcactccctg tcgtttccct tcaacatacg gtaactgtct tctccaagcg gcgcggaaa	180	
acaacggcat tccgattggg gaggatctt tcccatgaa caatgttagg agggcgccgc	240	
gacggaaact cactatctag cttaaatca tactcgacgaa gaatccgact catgattgt	300	
ttaatcatat actatgagca caaaactcaag gtttagtcaa gaaggtcgaa tgtcgtcac	360	
atgagcttga agggagattg atatggaaaa aaaaaagatg aaaatctaca tcacatacg	420	
aagctatgaa gcgtcccgaa caggcatatc tcccaatcc gaatgtcgaa ttcaaggcgc	480	
tgctgttaga aaatgtatgtt gtggcagtgc cagattgtt caaccatcgaa aaagggttga	540	
acaagtgagc gtcggataat ttctgtactgt ccgtattgt acatctcgct ggaatcgaa	600	
tctgtgtcc cggtgttagc tggtagccat cggtacatgt aattcggtt cggacaatgc	660	
gtctaaaagt gacttcaatc gccaggttagt tccaaatgtt aaaaaagact ggcttagaat	720	
agtccttaca ctcgcccact ggattgattc gtgtgactc tctcatcagg ctatccaa	780	
gtttcatatc aagcatagtc tggtagcgtga ttccgtcca accatgttg agcacgtttt	840	
gctgttctt tcggaggctc tccttcaagc tgctgtccgaa gatcatgtca aaaaagtatgt	900	
gagttaacgc catagctgtt gtatgaatga cagccatgtt caatattcct agcgtacat	960	
gcgcgttc ttcggccgt gcttcatcct cgggtactgc taactctgtt caccactgca	1020	
aaaagtcttc gtgttttcc tcagatgttta gtttcccttct ctggacttctt gaaccaagga	1080	
ggttttaat gtattgtat tggccgtgag ctctttcgc tggtggaaatc caccgtcgaa	1140	
aataatgtgt gaacaaatgg ccaaaactac gggaggtgaa tattgtatca aacgtgttgc	1200	
gactaaaaga agcgtatgtc tcgagaaaaa ttctgttgc acaaattcagg tctccaaacgaa	1260	
atagccctgc tggtagcacgg gtatgtatgt tgagaaccaa ttctgtatggaa ttgcacagaaa	1320	
tccaaagcatt ggaacccatca ctaatattag acaacactag acaagtggaa tggttggaaag	1380	
aatgaaaaca cataccgtcg ttggccggcag gtaagacttg cccaaaggca tgattgagct	1440	
catccaaatag cactggaaaga ttctgtgtt gattcgttta gcatatgtc aacgtattct	1500	
gttagattac acttacgaag ctggggatgc aaacgtgttgc gtatggcgcg tggtgttgc	1560	
tcgtccctta ataataatccct cgttaacttta ccacgttgc catcaatgtt ggtgtttaaa	1620	
gggtcttaatt tggtgttgc aaccggccgt aattcccgaa cgtattgtt ggtgtttaaa	1680	
atcagatcca tggtagccatctt aagtagccctt aacgggttgc ttgtgtgttgc taaccttaggc	1740	
ggtttagtact atccatcacgg atgctcacag acttggggacc gaacacccatc tcatagccat	1800	

2007-04-12 Sequence Listing-JAMES68.016APC.txt

gtttgactag	gccccggca	tggtcattat	aactcagccg	atcgaggaat	tgggggagta	1860
atcgaggcca	acgtcgaatg	gttggatac	attctttccg	tttggtaccg	taaacaacgt	1920
accacagtag	taaacagata	cccaactggga	cacgcgtgcaa	cattaacatt	ctcaagagta	1980
gctgatttga	cttgaatgga	atataaaatg	atttatgaat	taatttgaa	tgggcttggc	2040
atctacagaa	taaaagatta	taagacaaat	aagacaacgc	ttaatgttaa	aactttatgt	2100
taagtacttg	aaattgtct	aagccatcg	atctaattgc	acgcctgtcc	tctttctct	2160
tgacactatg	taaggagcct	gcacgataa	ctaaggatgt	gatccaagtt	agcgcagtt	2220
tttaaaatttc	gtcattttta	gacccactag	cgcccttctta	tatttagaca	gtattttacg	2280
gtatataacc	tagataat	cacccttgct	tataatacaa	tacaatccct	gaattgtttt	2340
acaatctat	ataatagaag	taattttagt	aattaaat	tagcttagaa	ataaaggaga	2400
caggggggtgg	tatattttag	tactagaacc	tgcatagaaa	tagatattct	cttttgcac	2460
gctatatacc	ttgcatat	cccttgcgt	tctctaataa	taggattact	tatagcttaat	2520
cacagccgtt	agggaggaat	caataactag	ggcatgtaga	cttgcataat	aattcagccg	2580
gtagagtgtg	tactttaatt	acagtgggt	tacaggggct	atttagatag	ccaaaagagg	2640
gaacccctat	ttctgacact	ggcgttagtaa	aaaaaaaaag	tgcgctaatg	tattacttta	2700
ttcttacgga	ttatgtatcg	atcctattgc	aggcatttac	tttgcactag	ttgaaaagat	2760
atattataaa	caggggggag	tggttttatg	caatgtgaac	aaatgttac	aaatttctac	2820
tccgtataaa	cataatttat	tgggggtctt	gacatgtccg	tcttagccga	caaccccacc	2880
atgccacgaa	tccgcggag	accccaatca	atccatacac	ggcacttaca	cagatcattc	2940
catccgcccc	agtaccgtcc	tatactccgt	acaccctaaa	agccttagag	cacaacata	3000
tgccgttgtc	tccctagtca	cacacaagat	gcctacccccc	cttcccgatt	cccccttctca	3060
catgtgtaac	gtatgtaa	caagggttag	tcgcgggtgc	acaaaaaaatg	aacgcgcag	3120
ccgaaagcca	tccgtgc	agcggaggtg	tcgcgggtcg	tatctgc	gctgtgtttc	3180
atttgttaggc	gtgtgcataa	tgcgcggggt	gcgtttaat	gtctagctga	agtcatatct	3240
gttgcgtgc	atcacatcac	ttttactcg	ggcaccattt	catgcaccct	aatagccacg	3300
acacacagaa	tccatcacca	attaactcg	gcagttcgca	cctacactaa	gccattcgaa	3360
caataatacat	tacttcaaag	actcacctta	ggccgttctt	tcacgcagcc	aagaagttttgc	3420
aacagctcg	tcttacatcc	ctgcgaatcg	gacgttttc	acggatagac	cctctaggcc	3480
cttaatgaag	acttctaaat	gtcaggagct	atctaattgc	agtagcttgc	caatacattt	3540
cttggaaagt	gttgtctcc	gtttcttat	cccttcttac	cttgccttgc	aggttttctta	3600
aagttaaagt	cgtcaagct	ggttcgat	gaagatgtta	acagagcatt	ttgactttcc	3660

2007-04-12 Sequence Listing-JAMES68.016APC.txt
taaacttaac ttgcacca ttgttaattc aggccgacc attattgtta taatattctt 3720
tcgatatctt aattacccta caaagggtt aatctgttcc cttgtatg cactttctt 3780
ggatgctcac caaaatttt caaggtaat gtacctgtt ttggcattgg agttcgat 3840
acaaaatggc tagcgctat tataaacgtg cgtcatgctc gacaatctat ccgcggggc 3900
tatgcaaagg ttgtgttaa aaacgaataa aagcgctcg taaacaaaga gaactaatac 3960
tagttctag tatggcgatt tcgcgttca gatacctact atgactcgaa tggaggtatt 4020
catttgtat agacagatga caaggagta tcagaatgtt gacgactatc atttgtcgtt 4080
ccgagctgc atgaccgagg taagtaacta gaccatgtt actgttagga aagaagaaaa 4140
agctaaaccg ccgtacagga gttcaattc aatggctac ttccaggaca ggcacacgaa 4200
gccccgattt tcccttaactc agtattgtt aaggccttga gctggcagag aacaaggcg 4260
aataaaccctt gcgatccatt ctgcatttccgcg aattcatgca ggggtttcag 4320
gaagagatgc gacgactaat ccaatataa aattcgtcag ttatgtcaaa ccgcctccgtt 4380
gctgtcctgg atccagcgca tgggtggcat gctgtgcctt gttttccctt ggctctgaag 4440
gtaattggc gccttactac atacgtcttgc ttccggaaac ctttgtccca agatgcac 4500
ttcctaaaca tggctgtca atttggcgtt gtgattccca gggatgcgtt catactacgt 4560
tcatggccag cattggcaag gccgtaaagca agtgcctaga cataaaccgc tcagggttt 4620
aactgcatt aacatttata tagcttatt gtaaagatct tgagtgcctt aagggtttag 4680
ggaaagttgc gaaacatttt gattgttgag ataaagagca ggagagaatc ccacgaaacg 4740
aacccaatga gtgtatggct gtctcgacca cccctcttag cattacacat taacgtat 4800
cttagatattc ttggatttca caatggctgtt ggttgcgtt catcctaaacg ctatgttgc 4860
cgatcagcac attggcaga tgatgattaa cactatttc gcacgtctt atacgtcgag 4920
tcaggttat tttttctgt atgaaaagtc cagagcttaa agctaactgg ctcatagctg 4980
tggtgcata ccattttga gcttgcctca cgtcctgaat atagcgatgc gcttctggaa 5040
gagatagatg catgcttga aaagcatgaa aaggccacta aagcagctct agactcaatg 5100
ttcaagggtt atagtttcat caaagaaaacg cagagggtt acccttctga cgcacgtata 5160
aattccctgt ctccgattcc atcattgcga tttgactaac gccaccgtca gcccgttctt 5220
caagactggc tctcaaaagac ttactttt ccaatggctt aaacatccca aaggccgtt 5280
tgatatttc gccgaattcg cctatcttgg aggacgagag atattacaag gatccgaaag 5340
ttttgtatgg atttcggtt gctaggatgc gtaatgaccc aaaatttagt ctattctgc 5400
acctaacacg aacgaatgaa caaagcatgc attttggac tggacgtcac gcctgtcctg 5460
gtagatttat ggttctgtt gaggtcaagt tagctgtat tcatacttta agtaatttc 5520
attttgtat tgagaattttt ggaccacggc cagcaaattca gccattttgtt aaatttcttc 5580

2007-04-12 Sequence Listing-JAMES68.016APC.txt

tacctgatat	gagtgc	aaaaa	atctggctaa	ggggagaaaag	agcttagggag	aagaatctgt	5640		
gaaaggcgtt	aagataatgc	caattgc	tac acgata	ata	tatgttc	atg	ttacgagtt	5700	
ttgaagagaa	gc	tttgc	gaggc	ctcta	agaaa	tttt	actac	ctatgata	5760
tatttctaac	atgat	ttttc	tagc	cgt	gt	aa	aa	gttgc	5820
tacatgttat	tagc	cgt	tttgc	tttgc	tttgc	tttgc	tttgc	tttgc	5880
aatgaaacta	tagg	caat	at	tttgc	tttgc	tttgc	tttgc	tttgc	5940
tttac	tttgc	tttgc	tttgc	tttgc	tttgc	tttgc	tttgc	tttgc	6000
tgtctctaag	tagc	gac	gc	taa	gttgc	tttgc	tttgc	tttgc	6060
ctgagttctt	tt	aca	aaat	ct	atgc	cccc	tttgc	tttgc	6120
agcttatatgt	aat	actat	tat	tttgc	tttgc	tttgc	tttgc	tttgc	6180
ataaaagagt	at	at	tttgc	tttgc	tttgc	tttgc	tttgc	tttgc	6240
ctattac	tttgc	tttgc	tttgc	tttgc	tttgc	tttgc	tttgc	tttgc	6300
tgtaaaataa	ttc	agg	ggg	gt	tttgc	tttgc	tttgc	tttgc	6360
atgctc	tttgc	tttgc	tttgc	tttgc	tttgc	tttgc	tttgc	tttgc	6420
acagc	tttgc	tttgc	tttgc	tttgc	tttgc	tttgc	tttgc	tttgc	6480
ttaat	gttgc	tttgc	tttgc	tttgc	tttgc	tttgc	tttgc	tttgc	6540
tcacatataa	gc	actt	cc	gttgc	tttgc	tttgc	tttgc	tttgc	6600
aattat	atcg	tg	tttgc	tttgc	tttgc	tttgc	tttgc	tttgc	6660
caattgtt	gttgc	tttgc	tttgc	tttgc	tttgc	tttgc	tttgc	tttgc	6720
cttggatcc	gc	aa	cc	agg	gttgc	tttgc	tttgc	tttgc	6780
gct	tttgc	tttgc	tttgc	tttgc	tttgc	tttgc	tttgc	tttgc	6840
acgc	tttgc	tttgc	tttgc	tttgc	tttgc	tttgc	tttgc	tttgc	6900
gccat	tttgc	tttgc	tttgc	tttgc	tttgc	tttgc	tttgc	tttgc	6960
aaaaaa	act	gc	at	gttgc	tttgc	tttgc	tttgc	tttgc	7020
tcc	tttgc	tttgc	tttgc	tttgc	tttgc	tttgc	tttgc	tttgc	7080
ttcaacaaa	tgg	gac	aaa	ctt	act	gttgc	tttgc	tttgc	7140
acaagg	tatt	aac	at	ctt	act	gttgc	tttgc	tttgc	7200
cgtt	tttgc	tttgc	tttgc	tttgc	tttgc	tttgc	tttgc	tttgc	7260
agactat	gttgc	tttgc	tttgc	tttgc	tttgc	tttgc	tttgc	tttgc	7320
agacttgg	tc	gg	gg	tttgc	tttgc	tttgc	tttgc	tttgc	7380
cttg	tttgc	tttgc	tttgc	tttgc	tttgc	tttgc	tttgc	tttgc	7440

2007-04-12 Sequence Listing-JAMES68.016APC.txt

agcgctaact cccccacacat	taacagggttt attaccgata	attcaggccc	gtctgtatt	7500		
gagctttag	gtattgactg	cgttgacac	gctcacctat	caaatgc	7560	
tacgttccata	ccatgagcag	ctcatttaac	accgtaaaga	attatgttac	tcttgggggt	7620
gcaatctggg	atgaacaac	ccaaaaggc	ttagaatac	tacaaggat	ttggcaccta	7680
ttgcttcagg	agccagaggg	tatttctgac	aatggattcg	acaagcctgt	gaacgactct	7740
tccatgttat	gccaaaagct	atattttagt	ttcagactac	gccccaggtac	agacttccct	7800
caaggtaaga	cctatgtgcc	aacttggAAC	tatttcgaa	ccgacgggaa	aactatccag	7860
aactatgagg	cgatcttcg	agcttgcac	catccctggg	gttagatag	gacgtacggc	7920
aaaatttttc	aagatgcatt	gtaaaggat	ccttcagatt	agcgctaaaa	ggagtttgag	7980
atactcctca	atgcaagcta	ttaggttg	aaattggccac	tactaattgg	agctttttat	8040
agcggacctg	caaccgagag	tcggaaaaaa	cccattca	gacgcacatc	ttttctgttt	8100
accgaagaaa	ctgggtct	ccagacgctg	tatttcagtc	ctccgattga	ggggaaaca	8160
gaagtccagt	caaatctcg	tgcttgaggt	tgaattaa	actgcgtct	acgtctaaaa	8220
gaagtgtt	tggtaacag	atgatagggt	tcccttgatc	tttcatat	tttgtacag	8280
ctgtggaaat	ttagggtct	gctctagata	aagccattgc	ttaatcg	atttgacgt	8340
ttctgagtt	tgtagtattc	catattttt	tcttaattaa	tcttgactt	attaagtgtt	8400
gtaggccgtt	gcaataat	ttgtttgt	cttacaagg	tagcactac	ccttgactc	8460
ttcgatttctt	gaacgagcgt	tgctattcg	agctgtgtt	aagaactagg	tttgcgcat	8520
aggtttaatt	ttgcaat	acgaggagag	gcccggtt	caactgc	taatacagg	8580
ttgctagaaa	atgggtgc	taatacag	gtctatgc	ctccatctc	cttaagcg	8640
tttacacctt	tgggtctagg	cttggtaaa	gggttagtt	tacaggcaag	agatgtcaca	8700
tcaagatagt	ttttgtctag	catagcgcgt	gagttacatt	tctccgaaat	cattttgtaa	8760
agtgcattt	ttctttcg	ccccagacgg	ccaccaagtt	ctctagaccc	tgacctgcct	8820
cctggagcgt	tttgagacac	gtgtttttaa	cactagg	ctctaa	tgagggtccc	8880
gtttaatgtc	gccttgattt	tggctctgaa	acgccttct	tatctgcgc	tcagtagt	8940
tgtcattaag	agcaaccaca	acaggaaagg	acaattctt	gttgcgtagg	tcttctgca	9000
cagtgcctt	gttaaaagcg	tactcttctg	agtatatgtt	cttgc	aatca	9060
gtgcgtacca	gctaccat	cattgaatta	gtttagc	cttgcgcgg	aattatgaa	9120
cgagcgaaaa	aaaaaaaaat	ttacataccc	aaatcg	ccct	aacagatcg	9180
accccttgg	ttccaaagcc	tccaaaggag	cacaaa	atgt	tgctgc	9240
catattttt	tacgtcaaca	ggcttcttc	accataggat	tgc	aaagatc	9300
tcttcgcca	accaaagaca	tgtcttg	ctcgag	tatc	gttcttagt	9360

2007-04-12 Sequence Listing-JAMES68.016APC.txt

ttcaattcca	aggacaggtt	gttctttcat	tgctctatta	atgacctttg	tgagaacgaa	9420
gtatgctcg	ttggcagttt	cgcgcgtatcc	gtatagcaag	tgagccgtag	tgtgatttt	9480
ccgcttaggg	ctgtggcgc	aaatatcg	aaccataatt	agacaaagat	ggaccgcac	9540
catgatatacc	aggatcaaag	aatgtttctt	gggatattta	tgttcaatg	ttggatgaag	9600
aaaatccacg	aggggagaga	aatgattatg	cccatagaga	ctaatacata	aagagtatgg	9660
acagtccagg	atcttgcatt	tgtgcgc	aatacctcg	tgagaggtac	gttcatagcc	9720
atagccataa	tgtcaatgg	cttgagaaac	gacagattgg	taatttatttgc	tgtactttac	9780
tagatacccg	agcgtaaaatg	caaacaagag	ggccgcattt	tcgatggccg	cagggcgagc	9840
cacgagccat	gctccagatg	tcatcttgg	atagtgtgt	acgtcggtta	aaggcagatt	9900
gccttggaaa	agaattcagt	taagcaaaat	tttatcaatt	ctcgcaat	atgcagagca	9960
actcaagcaa	atgttagaa	tatcgtaga	ctataattat	agaggcagag	cttcttagaaat	10020
agcgcaatca	tagtcttatt	tgtatagcc	caggcgcgg	taaatacata	cataataattc	10080
aacgaccc	tcaggcaatc	aagatgtgt	actcttattt	acataatgaa	caagatgtca	10140
gaggtattaa	aggccaaat	gtgtccctt	ggatagcaga	ccggactaaa	ccttcgcaaa	10200
ccatccat	aatactagct	gattttatca	ctatggacgg	attcagcaat	atggagcaag	10260
cggcgcgc	ttatcaggaa	gttcaatggc	tagctgaaac	ttttgtcaat	ttcatggggc	10320
ttggctggct	tatcaattac	gtcttgcgt	tctggcactc	taggggggt	gaaccggagca	10380
gcatggctct	catacccttc	tgcacaaca	tcgcctggg	gctcgatatac	acgattatct	10440
atccgtctcc	taacaaatgt	gaacttgcgg	ctttcatgc	aggtgtcaat	ttgaacttcc	10500
ttatcatgac	cttcgcagcc	cgttggcaa	gatccgatg	gagtcactca	cccacaatgg	10560
ctaagcatgc	agggttgatt	ataatcgag	gaatatttgc	gtgttccacc	ggacatgttag	10620
cattggcgat	ggaaatagga	cctcgcttgc	cttactcatg	ggggagctgtc	atatgccaac	10680
tagctctaag	cattggaggc	gtgtgtcaat	tgttgcagca	gcatactgt	ggtggggacat	10740
catggaaact	ttggtaatgt	aataaatca	ttacgtttt	aatctatatt	gaatgtcata	10800
tcaggggtgg	ctgacatgaa	agttttcagg	tcaagtcgt	ttttaggtct	tgttgcgc	10860
gttggcttt	cctttttcg	ctggagatac	tggcccgagg	cgtacggatg	gctggccagt	10920
cccccttatcc	tctggagtct	tgccacgtt	ctgtggccg	atttgacgt	cggggtttgt	10980
ctcccttctt	aggcagaaga	gaggacagtc	gaactccact	aagcttca	ctgcgcac	11040
aaaacgagta	acggcttgc	actagtcttca	tcttacgt	cgctatctt	catggtaat	11100
gtacaccc	atctttgtct	aaggcattac	actcaaatga	aatcatacat	gcaacttaaa	11160
ctatcatata	taggagatg	ccaaat	tttaag	caat	ttaaac	11202

<210> 25
 <211> 6583
 <212> DNA
 <213> *Neotyphodium lolii*

<400> 25	
aagctttta ccctaaatata tagtataaaa aagcaaatct ctcttagtaa gctactttat	60
aatattaata tatataactt attactctta attatctgt ataataataa gtaaataatc	120
tagattacta aatataataga aaaaaggctt tagacttagcc ttaagtacct taatataat	180
taaaatataaga tttaagaata atatataata ggtatattt agatataat aataaaaacc	240
tttagagatac ctatagatag ctatataaag ctacttttag gttaaacata taaggacttt	300
tactataaaa tttagattata agaaattcctt atttatattt aatatttaggg atttttata	360
atctcttcctt atacctttaa tcttttagctt taatataat ttttagcttggggatata	420
tagggaaaagc tcctttaaagt aataaacata taaaatatacg ctatataata actatgtttaa	480
aacccttaat aaaataatag taaagataat atatataaag tatctttataa gactatgttta	540
tactatagcg cactatatac cttttagttaa taaaatgtttag gttgtttaa cacccttagt	600
taaccgaaat cgaacctttt ctattatcta caccgacccc taccttgaca gtttagactc	660
ttgttcctgc aggtcagctt gctttagcgc aaggcaccgt tgccatgc atgtcatgt	720
cagcacggcg catagatgcc gatgtatgcg ccagtgcctt tcttgcaccc cagatgcaga	780
ccttgatatg gccttgcg agttaaacgc ttgcactat acggccttga agggcattga	840
gttggaggctt cttccctata atatgttgc ttgatatttttgc tcatatataa	900
cattggaaac attcaggaga cgtactacgc ttgtgtatgc aacgccttttcaatttgcaca	960
atgaaaccta ctactcgctg tccattcgac tatctggta gccagtgaa aacatcat	1020
ttcaaaacctt ttgtccagtt actgtcacctt ctcttcaag acgaagatcc cgacagat	1080
gcttttaattt tgacattat ggacgctgtc cacttctcg ccatcttgcatgcgat	1140
gccaaacaaa gtgtctacg caggaaccag ccggccgc ctttttttttggggagacg	1200
gaaacggcca cttaggcctt cctcggtcg ctgggtcg tcaacaggac aatgcgagag	1260
aaacccatcc ttggccgtga gctactaaac agccctggaa aatccatcca gggtcaggac	1320
gagttctttt ttgtggccgcg ctagggctg gagacttttccgtccgc tgacgagaga	1380
ctggcagctt acgtgcgtat gtccgcctt aaaaacggctt ccctcttgcgt gcttgcgtt	1440
cggttcttag ccaacgggttgg taccgagttt gatgacccgc ttgttgcgtt tggttgcgtt	1500
tctgcctttt gtcccaacaa agaggccgcg cgtactactg ttgttgcgtt ttgttgcgtt	1560
cctgtacgcg cagctgcac atgattgcaaa gaacattac tctccgcata acgtctcaaa	1620
caaggatcc gtcgtcaag atttgcgaaa tggcgaatttgcgttccatccgc ttgttgcgtt	1680

2007-04-12 Sequence Listing-JAMES68.016APC.txt

atggaagaag	ggttgaagt	gagcatgtac	cgcaaaacat	tattccttca	ccttgctcg	3660
gata	gctcac	cgtaaacgt	cctggtgagg	tattccagaa	tttagccggt	3720
ggacatgaa	ccatcatag	ctttgcca	tcctaaagtc	tagacctgaa	tagtgacgca	3780
gctggatg	ttggtgccg	acaattactg	cgccccacggc	ggacgcgatg	ccggggggcc	3840
gccccgg	cccccgc	atgc	agaacgatca	gctcttgagc	tcc tacgtcg	3900
atccaagcat	gca	actata	ttgagaccta	ctgtatgcag	cctcgaatgt	3960
ttcaacaag	aa	acatgcat	atatttgc	atgtcttcc	ttggcgctgc	4020
tacatgg	ttt	acat	atgac	tgacttgaag	cacggcatag	4080
gagcactg	ta	ccggctgaa	aattacattg	ta	cgggtct caatctgcgg	4140
gagcac	ccg	gga	gacccggc	at	tctgc	4200
agtc	agagat	gcata	accatc	aactgaaatc	aagttaggat	4260
tggcat	act	caattactg	tttgaactac	gcccgtcag	gttac	4320
gacag	ca	cc	ttgcattgc	aagtcttttgc	cacca	4380
gctg	gagc	gc	tgacttgg	gcagaccatt	gtgagctca	4440
tcttgg	gctac	ct	ggaaatgc	gctccgtt	ttggtatcg	4500
gagc	ctactt	tct	gggttccg	aatgcgc	tccat	4560
ggata	ctaa	aggt	gagctc	ccgtccgg	ggagaagac	4620
ccaa	acg	cgtt	aa	ggattccat	ttcaagatca	4680
cttgc	cctct	ccaa	acg	cttggat	gac	4740
cata	ca	gac	ctt	gtac	ttgc	4800
tgt	cta	atc	ttt	gatgt	ccgc	4860
gct	caaca	ag	gtat	ctt	ttcg	4920
atgc	gaga	ac	ctt	gtact	gtgc	4980
atgc	cct	cgt	ttt	tttgc	ttgc	5040
tgt	atgc	cc	ttt	tttgc	ttgc	5100
gct	tttag	act	ttt	tttgc	ttgc	5160
cg	gaaacc	gatt	ttt	tttgc	ttgc	5220
aagg	ctac	gc	ttt	tttgc	ttgc	5280
aaact	aaac	gg	ttt	tttgc	ttgc	5340
attcg	gggtt	cag	tttgc	cagtttgc	ttttgc	5400
cgctgt	gaca	agata	tttgc	aaaggaaat	tttgc	5460

2007-04-12 Sequence Listing-JAMES68.016APC.txt

cccggtacg	agaaaaccaa	ggacttgctg	cagggcatgg	tgacccatgg	gcccgtccgg	5520
ccctgtgaca	aacttggaca	tgatttctc	gtccaagcct	tgatccag	aatggctcca	5580
gttgttacca	tggcccaa	ccttggat	cttgcctcc	atccgttgg	tatcgaggag	5640
ctgcgtat	aggttctgca	agtcatagga	ccagacgggg	cgggattagg	aaacctacga	5700
caatcattt	ccaaacttga	caagatggac	agcgttga	ggaaatctgc	caggttcacc	5760
cctctatcta	tgagtaatgt	ccattctgt	cctccagaat	agcttgcgtt	catgactaat	5820
ctgtgtata	gtgacaatgc	accgcgggt	tcaggacgcc	aaggcatca	cgtccatga	5880
cgggtgtcat	cttccacag	gcacgcattgt	ggcattccca	cggttaccaca	ttggcagaga	5940
tcccaagttg	gtgtcagggt	cagatatact	tgacgggtgt	cgtgttaca	ggaaggacct	6000
cggcgaggcc	caagaaaacg	aagctccaa	gcatcgattt	gtcaccccg	acagcaacta	6060
cttgaccc	tttgggttgc	aatacgttgc	ccccggccga	tttatagcg	aacacatgtt	6120
gaagctgtat	atgaccgcg	tgctcctgcg	ctacgatgtt	aagtggctc	cgggagtccc	6180
tgtgttgc	caacagtatc	ggcatgttgc	tgcttatcc	agccaaaacca	cactgttgc	6240
taaacgcgc	aaagatggcg	atcagattct	ttaaagtatc	attatctgaa	aagaagaaaa	6300
gaggatgtct	tcctcttccc	gttaaagact	gctgagtgca	agtttgtaa	aggagaggtg	6360
ttacaaacag	aatgtacatg	cccaactagaa	cgtttagag	tatggcagct	accttgcata	6420
atatgttac	ttaataata	tataattgt	tattaattgt	ttttaaatat	ttagtattta	6480
ataaaaaata	gaatattgt	ttttatataa	attataatta	aacaatata	tatgtttaat	6540
aatataatta	aatataaaat	acttttattc	aagattataa	aac		6583

<210> 26
<211> 20
<212> DNA
<213> Neotyphodium lolii; Epichloe festucae; Epichloe typhina;

<220>
<221> misc_feature
<222> (3)..(3)
<223> y is t or c

<220>
<221> misc_feature
<222> (4)..(4)
<223> m is a or c

<220>
<221> misc_feature
<222> (6)..(6)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (12)..(12)

<223> r is g or a

<400> 26
caymngngtc arggtatgga

20

<210> 27

<211> 23

<212> DNA

<213> Neotyphodium lolii; Epichloe festucae; Epichloe typhina;

<220>

<221> misc_feature

<222> (6)..(6)

<223> r is g or a

<220>

<221> misc_feature

<222> (15)..(15)

<223> n is a, c, g, or t

<220>

<221> misc_feature

<222> (17)..(17)

<223> k is g or t

<220>

<221> misc_feature

<222> (21)..(21)

<223> y is t or c

<400> 27

ttcatrtaqt cgtcncktat ytg

23

<210> 28

<211> 23

<212> DNA

<213> Neotyphodium lolii; Epichloe festucae; Epichloe typhina;

<220>

<221> misc_feature

<222> (9)..(9)

<223> y is t or c

<220>

<221> misc_feature

<222> (12)..(12)

<223> n is a, c, g, or t

<220>

<221> misc_feature

<222> (15)..(15)

<223> s is g or c

<220>

<221> misc_feature

<222> (17)..(17)

<223> r is g or a

```

<220>
<221> misc_feature
<222> (21)..(21)
<223> y is t or c

<400> 28
aactttccyt cngtsargtc ytc 23

<210> 29
<211> 24
<212> DNA
<213> Neotyphodium lolii; Epichloe festucae; Epichloe typhina;

<400> 29
gcttggatcc gatattgaag gagc 24

<210> 30
<211> 24
<212> DNA
<213> Neotyphodium lolii; Epichloe festucae; Epichloe typhina;

<400> 30
ttggatccgg ttcccggtcg gcat 24

<210> 31
<211> 18
<212> DNA
<213> Neotyphodium lolii; Epichloe festucae; Epichloe typhina;

<400> 31
tggatcattc gcagatac 18

<210> 32
<211> 18
<212> DNA
<213> Neotyphodium lolii; Epichloe festucae; Epichloe typhina;

<400> 32
gtgtgagatt aagacgtc 18

<210> 33
<211> 18
<212> DNA
<213> Neotyphodium lolii; Epichloe festucae; Epichloe typhina;

<400> 33
accgacgcca ttaatgag 18

<210> 34
<211> 18
<212> DNA
<213> Neotyphodium lolii; Epichloe festucae; Epichloe typhina;

<400> 34
actggggcatc ttccatag 18

```

<210> 35	
<211> 18	
<212> DNA	
<213> Neotyphodium lolii; Epichloe festucae; Epichloe typhina;	
<400> 35	18
attagaggca ccgaacgc	
<210> 36	
<211> 18	
<212> DNA	
<213> Neotyphodium lolii; Epichloe festucae; Epichloe typhina;	
<400> 36	18
atcaagctgg ctatcctc	
<210> 37	
<211> 18	
<212> DNA	
<213> Neotyphodium lolii; Epichloe festucae; Epichloe typhina;	
<400> 37	18
aaataatggg caaggagc	
<210> 38	
<211> 19	
<212> DNA	
<213> Neotyphodium lolii; Epichloe festucae; Epichloe typhina;	
<400> 38	19
tggaaatttt ggaatggc	
<210> 39	
<211> 18	
<212> DNA	
<213> Neotyphodium lolii; Epichloe festucae; Epichloe typhina;	
<400> 39	18
gctcccttgcc cattat	
<210> 40	
<211> 18	
<212> DNA	
<213> Neotyphodium lolii; Epichloe festucae; Epichloe typhina;	
<400> 40	18
gtcttgatcg tctgcatc	
<210> 41	
<211> 18	
<212> DNA	
<213> Neotyphodium lolii; Epichloe festucae; Epichloe typhina;	
<400> 41	18
tgtccgtgca tccattgt	

2007-04-12 Sequence Listing-JAMES68.016APC.txt

<210> 42
<211> 18
<212> DNA
<213> *Neotyphodium lolii*; *Epichloe festucae*; *Epichloe typhina*;
<400> 42
catagagcta gcttagatg 18

<210> 43
<211> 18
<212> DNA
<213> *Neotyphodium lolii*; *Epichloe festucae*; *Epichloe typhina*;
<400> 43
gttcgggtcc tctataac 18

<210> 44
<211> 18
<212> DNA
<213> *Neotyphodium lolii*; *Epichloe festucae*; *Epichloe typhina*;
<400> 44
gaggatagcc agcttgat 18

<210> 45
<211> 24
<212> DNA
<213> *Neotyphodium lolii*; *Epichloe festucae*; *Epichloe typhina*;
<400> 45
gattggtaacc ttgaagtcgc tagt 24

<210> 46
<211> 25
<212> DNA
<213> *Neotyphodium lolii*; *Epichloe festucae*; *Epichloe typhina*;
<400> 46
gtagggttacc tctagttactg cctct 25

<210> 47
<211> 18
<212> DNA
<213> *Neotyphodium lolii*; *Epichloe festucae*; *Epichloe typhina*;
<400> 47
tagcgaatca ttgcgtcg 18

<210> 48
<211> 20
<212> DNA
<213> *Neotyphodium lolii*; *Epichloe festucae*; *Epichloe typhina*;
<400> 48
atggctgcca atgactttcc 20

<210> 49		
<211> 20		
<212> DNA		
<213> Neotyphodium lolii; Epichloe festucae; Epichloe typhina;		
<400> 49		20
aggccatttt cgacagttgt		
<210> 50		
<211> 20		
<212> DNA		
<213> Neotyphodium lolii; Epichloe festucae; Epichloe typhina;		
<400> 50		20
ccagcaagca tgcacattac		
<210> 51		
<211> 20		
<212> DNA		
<213> Neotyphodium lolii; Epichloe festucae; Epichloe typhina;		
<400> 51		20
tgcgtgagag ataaagcaag		
<210> 52		
<211> 2544		
<212> DNA		
<213> Neotyphodium lolii		
<400> 52		60
atgaaaccta ctactcgctg tccattcgac tatctggta gccagtgtgg aaagcatcat		
tccaaaacct ttgtccagtt actgtcacct ctcttccaag acgaagatcc cgacagatat		120
gcttaattt tgacattat ggacgctgtc cacttctcg ccattcttgcatcgat		180
gccaaccaaa gtgtcttacg caggaaccag cccggccccc atgttggttt tggggagacg		240
gaaaacggcca cttaggccta cctcggtctg ctgcgggtcg tcaacaggac aatgcgagag		300
aacccagtcc tggccgggtga gctactaaac agccctggaaag aaattcacca gggtcaggagc		360
gagactcttgc tggggcgccg cgacgggtcg gagactttc ccgtcgccga tgacgagaga		420
ctggcagcct acgtgcgcatt gtccgcctc aaaacgggtcc cctcttcgt gctccctggaa		480
cggttcttag ccaacgggtgg taccgagttt gatgacgtgc tggtaacgtt tgggtacgtt		540
tctgcctctt gtcccaacaa agagggccgc cgactaactg gttctctt gttcttgaag		600
cctgtacgc cagctgcac atgattgcaaa gaaacatttac tctccgcatt acgtctcaa		660
caagggttcc gtcgctgaag atttgcggaa tggcgttgc tcttgcatttgc tttgtggcgc		720
cttgattgatgg aacaaggccgg aagggtatgtt gggagaggcc ttgcgcacgc gcagcgcacgg		780
ggataccgaa caggcactcc gcgttttggaa gagccggca gtcacggacg cgtgcctgca		840
cgcaactcgag gtcgcgatgt tcggcttgaa agaccttgc gggcatggg gacgacgaga		900

2007-04-12 Sequence Listing-JAMES68.016APC.txt

aaaaatgaga	tccgacaccc	tcgacggcga	cgacttaaca	aggccaagca	ccatcacaca	960
acatgaacaa	gatgaccatg	ttgatagagc	tgccatcgat	gccaagagtg	atgcgagtgg	1020
cagtagcaat	aagtctctca	cgc(ccc)aga	gacagcccct	acgacggaca	ccctgtccga	1080
gacagctgtg	ggggatatct	cgtcagtcga	cgtggattac	tgactcgga	gatgcgttcc	1140
cataatcggt	agcccttga	aatcatgccc	agtctactcg	gaagcggAAC	ggggaaacaca	1200
gctgcgttc	cttcaggaac	atgtgctacc	taatctaggt	cctcgtccat	cctccccccgg	1260
ctcgagatc	cagtccatgg	ctacattcg	cggctttcct	ctccaaccca	gcatcaaccc	1320
gagcggtcc	ggccaggcca	aagtccgcta	cacgtttggaa	ccgctcgaca	gcctgagtgg	1380
caccgaggtt	gacccttttgc	cactggcgc	ggctcagcga	gtgctcgaaa	agctctccac	1440
ccttctcgcc	gtctggcctg	gatggatcg	cgctttgtac	gctgcgtacc	acccaaccag	1500
agaggaagtc	gagcaattac	acccgaatct	gcacgagtagc	ctcagaggcg	tcctcgtag	1560
aacgacagga	cgccaagatg	tgcaaggttcc	tcccatgccc	cgaatgtggg	tgtgcttcgt	1620
tgcgcttgat	ctggggggcg	cctcacaggc	actcaagggtt	tattttgcac	ccaaagatcaa	1680
agaagccgtg	actggatttc	cttcctgcaa	atacacttgt	cagattctac	ggacgggttg	1740
taggtttggc	aacgccaagg	ccgtcgacat	gcttgagcag	tgtagtcacgt	ctgggagcac	1800
tatccaggtc	cgaggtacta	acaagatttt	gtcaggttct	tgccagagga	gcacagcata	1860
ggcgtgtcg	aactgattgc	cattgattgc	gtcccagaag	aaatgcagcc	atcggcgcgg	1920
atcaagggtct	acgttcacac	catgagcaac	tcgtttcaga	cagtacgcaa	gtacatgaca	1980
atgggtggcc	gctgcatgga	tcctgcgacc	ctcgagggtc	tgaaaaactt	gcacgacgtg	2040
tggtaactccc	tttcgggga	aagtcaaggt	attgtcaatg	aagagtacag	caagcccttg	2100
actggcttta	gctcgatgca	gcatcaacttgc	tacttttagct	acgagatgac	gcctggcaat	2160
gctgtatcccg	gcgtcaaagt	ctacataacct	gtgcaaagct	acgcgcggaga	cgacaagacc	2220
atcgcgcaga	actacgaggc	aaattttccgg	caactcaact	ggccgtgggg	cgAACCCGGC	2280
gtttacgaag	cgtgtataga	gagtgtctg	taactaatga	caggccctt	gaccatatta	2340
cttactgaca	acttggaaatt	tagggatcca	gtttaaggcaca	gccgcgcac	gttcctccat	2400
ggaggatctt	ctttcatctt	ttccaaaggc	cgaggagttt	atcgtccat	atatctagac	2460
cctccactgg	aggaaggagg	gaacattgct	gtattcgac	accacgacga	tcaggatact	2520
atagttgacc	ttggcaatat	gttag				2544

<210> 53

<211> 788

<212> PRT

<213> Neotyphodium lolii

<220>
 <221> misc_feature
 <222> (185)..(185)
 <223> Xaa can be any naturally occurring amino acid

<400> 53

Met Lys Pro Thr Thr Arg Cys Pro Phe Asp Tyr Leu Val Ser Gln Cys
 1 5 10 15

Gly Lys His His Phe Lys Thr Phe Val Gln Leu Leu Ser Pro Leu Leu
 20 25 30

Gln Asp Glu Asp Pro Asp Arg Tyr Ala Leu Ile Leu Asp Ile Met Asp
 35 40 45

Ala Val His Phe Ser Ala Ile Leu Ile Asp Asp Ile Ala Asn Gln Ser
 50 55 60

Ala Leu Arg Arg Asn Gln Pro Ala Ala His Val Val Phe Gly Glu Thr
 65 70 75 80

Glu Thr Ala Thr Arg Ala Tyr Leu Val Leu Leu Arg Val Val Asn Arg
 85 90 95

Thr Met Arg Glu Asn Pro Val Leu Ala Gly Glu Leu Leu Asn Ser Leu
 100 105 110

Glu Glu Ile His Gln Gly Gln Asp Glu Ser Leu Val Trp Arg Arg Asp
 115 120 125

Gly Leu Glu Thr Phe Pro Val Ala Asp Asp Glu Arg Leu Ala Ala Tyr
 130 135 140

Val Arg Met Ser Arg Leu Lys Thr Gly Ser Leu Phe Val Leu Leu Gly
 145 150 155 160

Arg Leu Leu Ala Asn Gly Gly Thr Glu Phe Asp Asp Leu Leu Val Arg
 165 170 175

Phe Gly Leu Tyr Ala Gln Leu Gln Xaa Asp Cys Lys Asn Ile Tyr Ser
 180 185 190

Pro Glu Tyr Ala Leu Asn Lys Gly Ser Val Ala Glu Asp Leu Arg Asn
 195 200 205

Gly Glu Leu Ser Tyr Pro Val Val Val Ala Leu Ile Glu Asn Lys Ala
 210 215 220

Glu Gly Ile Val Gly Glu Ala Leu Arg Thr Arg Ser Asp Gly Asp Thr
 225 230 235 240

Glu Gln Ala Leu Arg Val Leu Glu Ser Pro Ala Val Lys Asp Ala Cys
 245 250 255

Leu His Ala Leu Glu Ala Ala Ser Val Gly Leu Glu Asp Leu Val Glu
 260 265 270

Ala Trp Gly Arg Arg Glu Lys Met Arg Ser Asp Thr Leu Asp Gly Asp
 275 280 285

Asp Leu Thr Arg Pro Ser Thr Ile Thr Gln His Glu Gln Asp Asp His
 290 295 300

Val Asp Arg Ala Ala Ile Asp Ala Lys Ser Asp Ala Ser Gly Ser Ser
 305 310 315 320

Asn Lys Ser Leu Thr Pro Pro Glu Thr Ala Pro Thr Thr Asp Thr Leu
 325 330 335

Ser Glu Thr Ala Val Gly Asp Ile Ser Ser Val Asp Val Asp Tyr Trp
 340 345 350

Thr Arg Arg Cys Val Pro Ile Ile Gly Ser Leu Leu Lys Ser Cys Arg
 355 360 365

Val Tyr Ser Glu Ala Glu Arg Glu Thr Gln Leu Arg Phe Leu Gln Glu
 370 375 380

His Val Leu Pro Asn Leu Gly Pro Arg Pro Ser Ser Pro Gly Ser Gln
 385 390 395 400

Ile Gln Ser Met Ala Thr Phe Ser Gly Phe Pro Leu Gln Pro Ser Ile
 405 410 415

Asn Leu Ser Gly Ser Gly Gln Ala Lys Val Arg Tyr Thr Phe Glu Pro
 420 425 430

Leu Asp Ser Leu Ser Gly Thr Glu Val Asp Pro Phe Ala Leu Ala Pro
 435 440 445

Ala Gln Arg Val Leu Glu Lys Leu Ser Thr Leu Leu Gly Val Trp Pro
 450 455 460

Gly Trp Ile Asp Ala Leu Ile Ala Ala Tyr His Pro Thr Arg Glu Glu
 465 470 475 480

2007-04-12 Sequence Listing-JAMES68.016APC.txt

Val Glu Gln Leu His Pro Asn Leu His Glu Tyr Leu Arg Gly Val Leu
485 490 495

Val Arg Thr Thr Gly Arg Gln Asp Val Gln Val Pro Pro Met Pro Arg
500 505 510

Met Trp Val Cys Phe Val Ala Leu Asp Leu Glu Gly Ala Ser Gln Ala
515 520 525

Leu Lys Val Tyr Phe Asp Pro Lys Ile Lys Glu Ala Val Thr Gly Ile
530 535 540

Pro Ser Cys Lys Tyr Thr Cys Gln Ile Leu Arg Thr Val Asp Arg Phe
545 550 555 560

Gly Asn Ala Lys Ala Val Asp Met Leu Glu Gln Phe Leu Ala Glu Glu
565 570 575

His Ser Ile Gly Ala Val Glu Leu Ile Ala Ile Asp Cys Val Pro Glu
580 585 590

Glu Met Gln Pro Ser Ala Arg Ile Lys Val Tyr Val His Thr Met Ser
595 600 605

Asn Ser Phe Gln Thr Val Arg Lys Tyr Met Thr Met Gly Gly Arg Cys
610 615 620

Met Asp Pro Ala Thr Leu Glu Gly Leu Glu Asn Leu His Asp Val Trp
625 630 635 640

Tyr Ser Leu Leu Gly Glu Ser Gln Gly Ile Val Asn Glu Glu Tyr Ser
645 650 655

Lys Pro Leu Thr Gly Phe Ser Ser Met Gln His His Leu Tyr Phe Ser
660 665 670

Tyr Glu Met Thr Pro Gly Asn Ala Asp Pro Gly Val Lys Val Tyr Ile
675 680 685

Pro Val Gln Ser Tyr Ala Pro Asp Asp Lys Thr Ile Ala Gln Asn Tyr
690 695 700

Glu Ala Asn Phe Arg Gln Leu Asn Trp Pro Trp Gly Glu Pro Gly Val
705 710 715 720

Tyr Glu Ala Val Ile Glu Ser Ala Leu Gly Pro Val Lys His Ser Arg
725 730 735

Ala Thr Phe Leu His Gly Gly Ser Ser Phe Ile Phe Ser Lys Gly Arg
740 745 750

Gly Val Tyr Gln Ser Ile Tyr Leu Asp Pro Pro Leu Glu Glu Gly Gly
755 760 765

Asn Ile Ala Val Phe Glu His His Asp Asp Gln Asp Thr Ile Val Asp
770 775 780

Leu Gly Asn Met
785

<210> 54
<211> 742
<212> DNA
<213> *Neotyphodium lolii*

<400> 54
atggagaacg cggcgctcgc ttatcaggaa gttcaatggc tagctgaaac ttttgtcact 60
ttcatggggc ttggctggct tatcaattac gcttgcatac tctggcactc taggagggg 120
gaaccggagca gcatggctct catacccttc tgacaacaaca tcgcctggaa gtcgtatatac 180
acgattatct atccgtctcc taacaaagtg gaacttgcgg ctttcatacg aggtgtcact 240
ttgaacttcc ttatcatgac ctctgcagcc cgttcggcaa gatccgagtg gagtcactca 300
cccacaatgg ctaagcatgc aggtttgatt atatgcgcag gaatattgtat gtgcttcacc 360
ggacatgttag cattggcgat ggaatagga cctgcgcctt cttactcatg gggagctgtc 420
atatgccaaac tagctctaag cattggaggc gtgtgtcaat tggcggcata gcatagttact 480
ggtgggacat catggaaact ttggtaagtg aataaatcaa ttacgtttct aatctatatt 540
gaatgtcata tcaggggtagt ctgacatgaa agtttcagg tcaagtcgtat ttcttaggc 600
tttgtgtcg gttggctttc ctttcatacg ctggagatac tggcccgagg cgtacggatg 660
gctggccagt ccccttatcc tctggagttc tgccacgttt ctgtggccg atttgacgtat 720
cgaaatttat ctcccttc tttt ag 742

<210> 55
<211> 227
<212> PRT
<213> *Neotyphodium lolii*

<400> 55

Met Asp Gly Phe Ser Asn Met Glu Gln Ala Pro Leu Ala Tyr Gln Glu
1 5 10 15

Leu Ile Asn Tyr Val Leu Met Ile Trp His Ser Arg Arg Gly Glu Pro
35 40 45

Ser Ser Met Ala Leu Ile Pro Leu Cys Asn Asn Ile Ala Trp Glu Leu
50 55 60

Val Tyr Thr Ile Ile Tyr Pro Ser Pro Asn Lys Val Glu Leu Ala Ala
65 70 75 80

Phe Ile Ala Gly Val Thr Leu Asn Phe Leu Ile Met Thr Ser Ala Ala
85 90 95

Arg Ser Ala Arg Ser Glu Trp Ser His Ser Pro Thr Met Ala Lys His
100 105 110

Ala Gly Leu Ile Ile Val Ala Gly Ile Leu Met Cys Phe Thr Gly His
115 120 125

Val Ala Leu Ala Met Glu Ile Gly Pro Ala Leu Ala Tyr Ser Trp Gly
130 135 140

Ala Val Ile Cys Gln Leu Ala Leu Ser Ile Gly Gly Val Cys Gln Leu
145 150 155 160

Leu Gln Gln His Ser Thr Gly Gly Thr Ser Trp Lys Leu Trp Ser Ser
165 170 175

Arg Phe Leu Gly Ser Cys Cys Ala Val Gly Phe Ala Phe Leu Arg Trp
180 185 190

Arg Tyr Trp Pro Glu Ala Tyr Gly Trp Leu Ala Ser Pro Leu Ile Leu
195 200 205

Trp Ser Leu Ala Thr Phe Leu Val Ala Asp Leu Thr Tyr Gly Val Cys
210 215 220

Leu Leu Leu
225